ENGINEERING NEWS-RECORD

A McGRAW HILL PUBLICATION

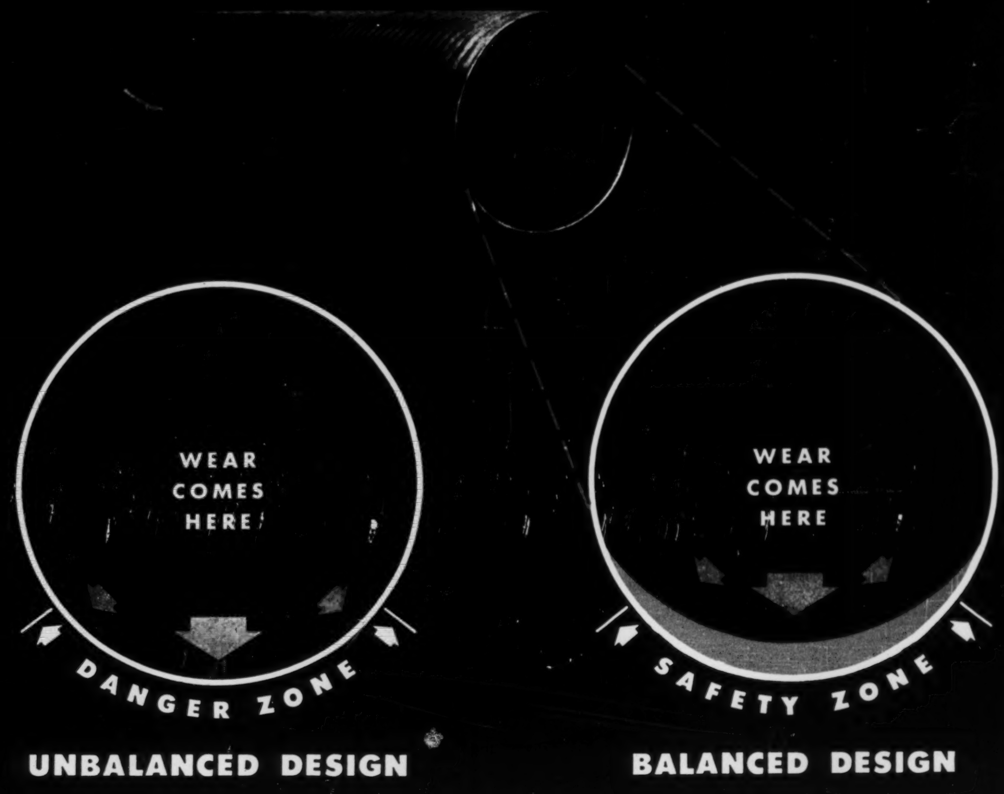
JANUARY 6, 1949

BEN C. GERWICK, INC.
DRIVER NO. 57

Built for the job, this pile-driving rig puts down double-batter piles for California water-supply system

FEATURING

CAN EQUIPMENT SPEED ANSWER RISING EARTHMOVING COSTS?



The pipe that was "rubbed the wrong way"

The rub came from erosion that wore out culvert bottoms and ruffled the feelings of engineers and officials because it hit them in the pocketbook. When they had to replace any type of culvert they generally found the upper three-fourths in good condition.

Then ARMCO Engineers smoothed things over by developing ARMCO PAVED-INVERT Pipe. This new pipe had a thick bituminous pavement in the invert for greater protection against erosion. Now the bottom lasts as long as the top—service life is up, maintenance down—and everybody's happy.

Giving engineers and contractors exactly what they need has been a prime goal at Armco for more than 40 years. Spiral Welded Steel Pipe, HEL-COR Perforated Pipe, STEELOX Buildings, FLEX-BEAM Guardrail, PIPE-ARCH and sturdy MULTI-PLATE Bridges are just a few examples.

Today you can bring your drainage and construction problems to Armco with full assurance you will receive all the benefits of long experience, extensive research facilities, and a real interest in helping to solve them.

Armco has a complete range of engineered products and convenient, authoritative data to help you. If your problem is difficult or unusual, why not talk it over with us.

ARMCO

ARMCO DRAINAGE & METAL PRODUCTS, INC.

MIDDLETOWN, OHIO • DIVISION OFFICES IN THE FOLLOWING CITIES

Berkeley, California ★ Middletown, Ohio ★ Atlanta, Georgia ★ Baltimore, Maryland
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Portland, Oregon ★ South Bend, Indiana ★ Houston, Texas ★ Washington, D. C.

Research keeps

BFG

FIRST IN RUBBER

Where double bruise protection pays off with 65 per cent recappable tires!

THE picture above was taken at Bull Shoals Dam in Arkansas. Note the scraped marks on the sidewalls of the B. F. Goodrich Universal tires. Terrain and rocks at Bull Shoals cause tire problems as tough as you'd ever expect to find anywhere.

For example, *Ozark Dam Constructors, Inc.* operate trucks like the above in a stone quarry. Previously, they operated trucks of this type in excavating a rock filled river-bed. In both places, wet conditions often cause considerable cutting action. And in both places, tires are in danger of bruising and crushing.

In spite of these extremely bad conditions, 65 per cent of the B. F. Goodrich tires on these trucks are found to be recappable!

How do B. F. Goodrich tires do it? Part of the answer is the special cut-resisting tread compound worked out by BFG engineers.

Another part of the answer is the *double nylon shock shield* built into all large B. F. Goodrich off-road Silvertowns. This shield is built in under the tread. It's a set of four layers of rubber-coated nylon cords between the tread and the plies. These breakers are in pairs, with the cords in each pair running parallel to each other, but with each pair running in opposite directions to give balanced strength. The breakers are cushioned with thick layers of shock-resistant rubber.

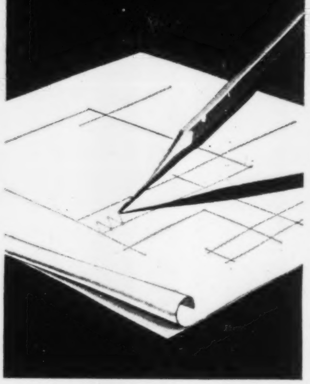
Under impact, the cords stretch *together*, and return to their original position. The blow is distributed and absorbed by the rubber cushions; the shock passed on to the cord body is greatly reduced.

Find out how B. F. Goodrich off-the-road tires can do *more* work for you and save you money. See the B. F. Goodrich dealer or write us direct. *The B. F. Goodrich Company, Akron, Ohio.*

Truck Tires BY

B. F. Goodrich

TRACING CLOTH
for
HARD PENCILS



● Imperial Pencil Tracing Cloth has the same superbly uniform cloth foundation and transparency as the world famous Imperial Tracing Cloth. But it is distinguished by its special dull drawing surface, on which hard pencils can be used, giving clean, sharp, opaque, non-smudging lines.

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ENGINEERING NEWS-RECORD

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Number of copies of this issue printed........ 44,038

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January 6, 1949 **ENGINEERING NEWS-RECORD** Vol. 142—No. 1

Publication Office—99-129 N. Broadway, Albany 1, N. Y.

Executive and Editorial Offices—330 West 42nd St., New York 18, N. Y.

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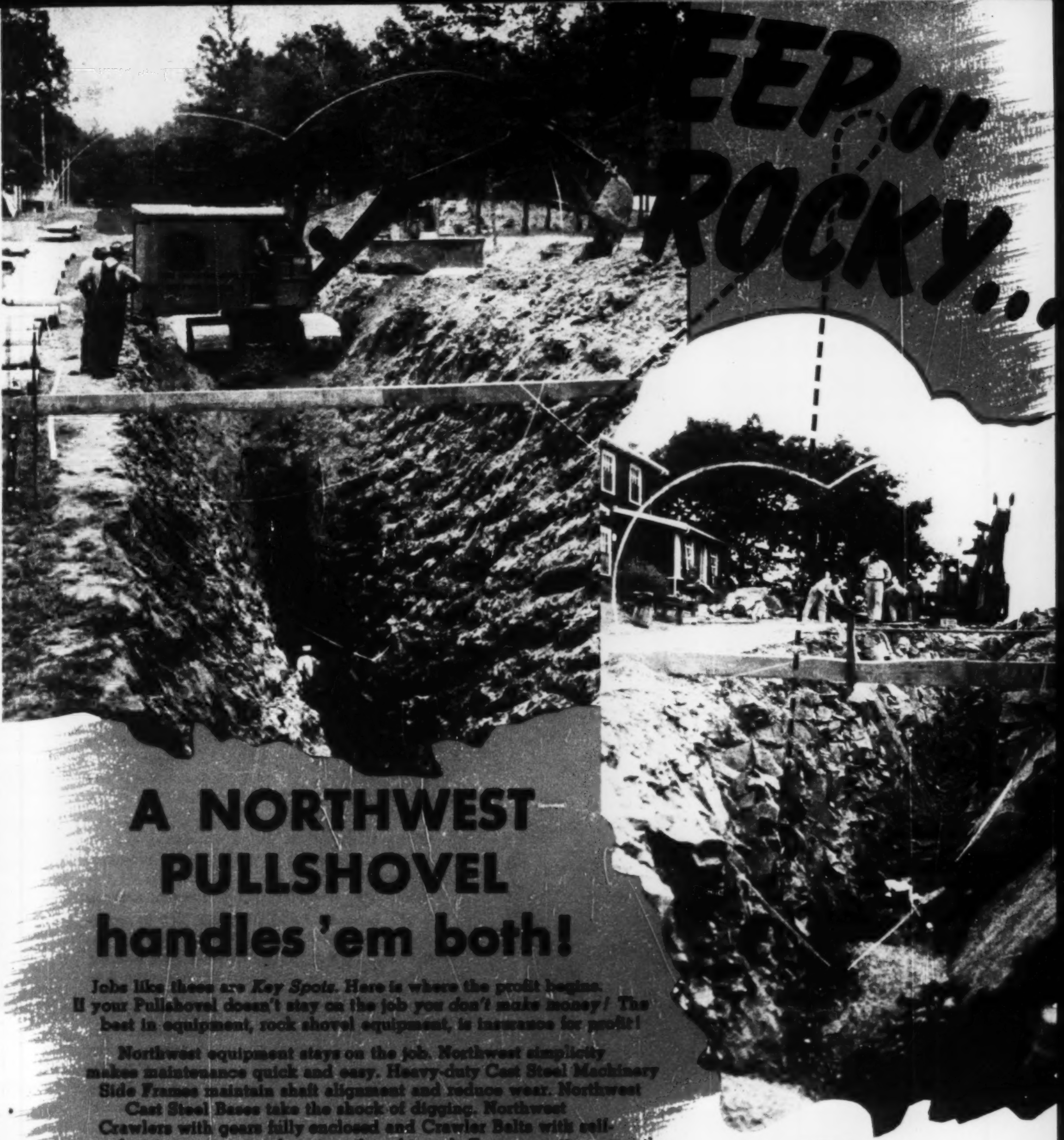
Published every Thursday by the McGraw-Hill Publishing Co., Inc., James H. McGraw (1860-1948) founder; JAMES H. McGRAW, JR., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Executive Assistant for Publications; J. E. BLACKBURN, JR., Director of Circulation. Cable Address, "McGraw-Hill New York."

Address all communications about subscriptions to Director of Circulation. Price 35¢ per copy.

Subscriptions	1 year	2 years	3 years
U. S. and possessions	$6	$9	$12
Pan America	10	16	20
Canada	7	11	14
All others	20	30	40

Please indicate position and company connection on all subscription orders.

Entered as Second Class matter October 29, 1936, at the Post Office at Albany, N. Y., under Act of March 3, 1879. Printed in U. S. A.



A NORTHWEST PULLSHOVEL handles 'em both!

Jobs like these are *Key Spots*. Here is where the profit begins. If your Pullshovel doesn't stay on the job *you don't make money!* The best in equipment, rock shovel equipment, is insurance for profit!

Northwest equipment stays on the job. Northwest simplicity makes maintenance quick and easy. Heavy-duty Cast Steel Machinery Side Frames maintain shaft alignment and reduce wear. Northwest Cast Steel Bases take the shock of digging. Northwest Crawlers with gears fully enclosed and Crawler Belts with self-cleaning action stand up in miles of travel. Easy operation, smooth swing, smooth hoist action and other advantages are provided by special Northwest features. These are things that make a better machine for the *Key Spots*. You can't afford anything but the best for the heart of the job. Plan to have a Northwest.

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A REAL ROCK SHOVEL
for the heart of the job
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THEY GO TOGETHER

WAGONJACKS and CARSET BITS make a perfect drilling combination for the contractor. They go together. Maximum benefits are obtained only when one is used with the other.

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The Ingersoll-Rand CARSET BIT is recognized as a revolutionary development in the rock-drilling field. It is extremely long wearing and fast drilling. One Carset Bit will often drill several hundred feet of hole in hard rock. Elapsed drilling time is frequently cut in half. In addition, time is saved that is normally required to remove a dull bit and replace it with a sharp one. Reconditioning of bits is practically eliminated. The I-R Wagonjack and I-R Carset Bit combination make new drilling records. *They go together.*

Wagonjacks and Carset Bits are available for immediate delivery. Call the nearest Ingersoll-Rand branch office for full details.

Demand the

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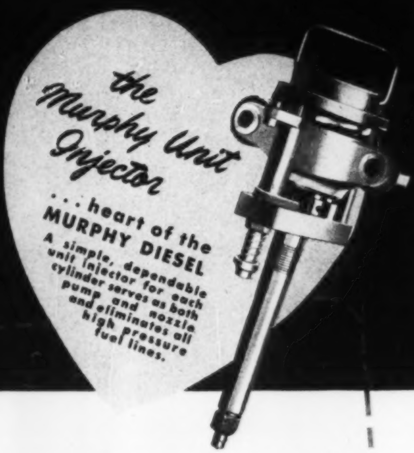
Get the most profit out of your jobs with

MURPHY DIESEL POWER

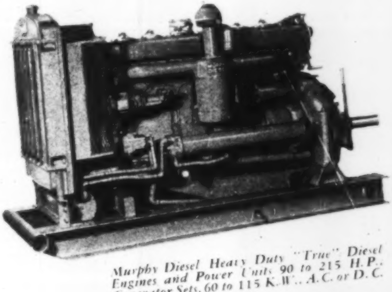


the Murphy Unit Injector

. . . heart of the MURPHY DIESEL

A simple, dependable unit injector for each cylinder serves as both pump and nozzle and eliminates all high pressure fuel lines.

A Model ME-6 Murphy Diesel rated at 135 H.P. continuous, 160 H.P. intermittent, powers this Universal Pulverizer owned by State Line Lime Stone, Clinton, Wis.



Murphy Diesel Heavy Duty "True" Diesel Engines and Power Units 90 to 215 H.P., Generator Sets, 60 to 115 K.W., A.C. or D.C.

The Murphy Diesel is ruggedly built to give dependable service under the severest operating conditions. And it is economical too. The "true" diesel operating principle — solid fuel injected directly into a plain open combustion chamber — makes it possible to get the most power out of every drop of fuel. The Murphy Diesel stays on the job longer — ordinary fuel injection troubles are unknown . . . four valves per cylinder run cooler, rarely, if ever, have to be ground . . . dual overhead camshafts driven from the flywheel end minimize timing faults.

This combination of economy and dependability means more profit for you. Ask your Murphy Diesel Dealer to give you full details. And be sure and get a copy of the booklet *"7 Questions to Ask a Diesel Engine Salesman"*.

MURPHY DIESEL COMPANY
5311 West Burnham St., Milwaukee 14, Wis.

LOWEST ULTIMATE POWER COST

MURPHY DIESEL

Even on Jobs as tough as these

Texaco Marfak seals out dirt and moisture . . . reduces maintenance costs. That's why more than 300 million pounds of Marfak have been sold !

Tune in . . .
TEXACO STAR THEATRE
presents MILTON BERLE
every Wednesday night.
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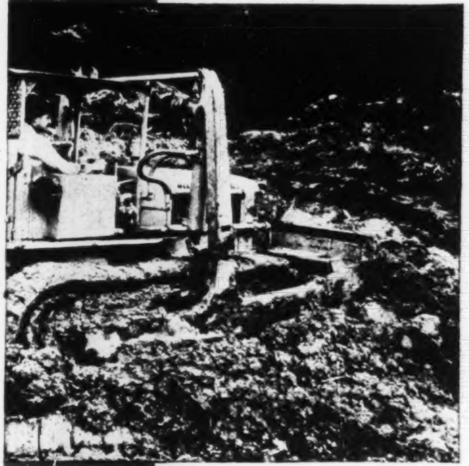

BULLDOZE wet, sticky mud . . . churn through desert dust and heat . . . no matter how extreme the conditions, chassis parts get greater protection and last longer when lubricated with *Texaco Marfak*. Maintenance costs are lower!

Texaco Marfak stays in the bearings. It won't work out in rough service or under heavy loads. Ordinary road splash won't wash it out. *Marfak* forms a tough "collar" at the edge of a bearing, sealing itself in and sealing out dirt and dampness. It keeps moisture off metal, protects against rust. And because it's long lasting, fewer applications are needed.

In wheel bearings, *Texaco Marfak Heavy Duty* assures similarly *long-lasting* protection and worthwhile reduction in maintenance costs. *Marfak Heavy Duty* also seals out dirt and moisture, seals itself in, and protects against rust. It won't leak onto brakes . . . requires no seasonal re-packing.

OTHER LUBRICANTS FOR FURTHER PROTECTION

Keep Diesel and heavy-duty gasoline engines clean by lubricating with *Texaco Ursa Oil X***. This is a fully detergent and dispersive oil, made to assure trouble-free operation, maximum efficiency, minimum fuel costs.

Protect track rolls from dirt and moisture with *Texaco Track Roll Lubricant*. It seals out contaminants, assures longer bearing life.

Let a Texaco Lubrication Engineer tell you about Texaco's Simplified Lubrication Plan to assure more efficient and economical performance from all your equipment. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 E. 42nd St., New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

1892 ★ 1949

Fifty Fifty... FOR 57 YEARS

INDUSTRY AND HYATT PARTNERS IN MECHANICAL PROGRESS

HYATT'S Fifty-Seventh "Thank You" Note

AGAIN for the fifty-seventh year, all the folks at Hyatt say sincerely — "We thank you."

Here at Hyatt it is not our custom to think only of our customers at greeting time.

That "the customer is boss" is constantly kept before our four thousand workers every working day.

Witness the slogans, some of which are reproduced here, contributed by Hyatt employees.

With this spirit prevailing, it is natural that every Hyatt man and woman is imbued with a desire to make Hyatt Roller Bearings precisely accurate, dependable and long-lasting.

Hyatt has a long and unequalled experience as specialists in roller bearings. Our design engineers, laboratory technicians, backed by modern machines, manned by skilled operators, show the way in serving old and new Hyatt friends.

You just can't stay in business as long as Hyatt has without always looking ahead and giving workers the highest quality materials and the most modern equipment with which to produce the finest grade of roller bearings.

Our objective for 1949, as always, is your complete satisfaction with Hyatt bearings and service. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey; Chicago; Detroit; Pittsburgh; and Oakland, California.

"THE CUSTOMER IS BOSS" SLOGAN SERIES

That The Customer Is Boss, Don't Just Know It---Show It!

WARD QUINTON DEPARTMENT 124

"THE CUSTOMER IS BOSS" SLOGAN SERIES

Our Business From Day To Day Depends On What The Customers Say

DANIEL McCARTHY DEPT. 50 CLARK PLANT

"THE CUSTOMER IS BOSS" SLOGAN SERIES

If It's Not A Precision Product, The Customer "NO'S" It

EDWARD J. KOEHLER DEPARTMENT

HYATT ROLLER BEARINGS

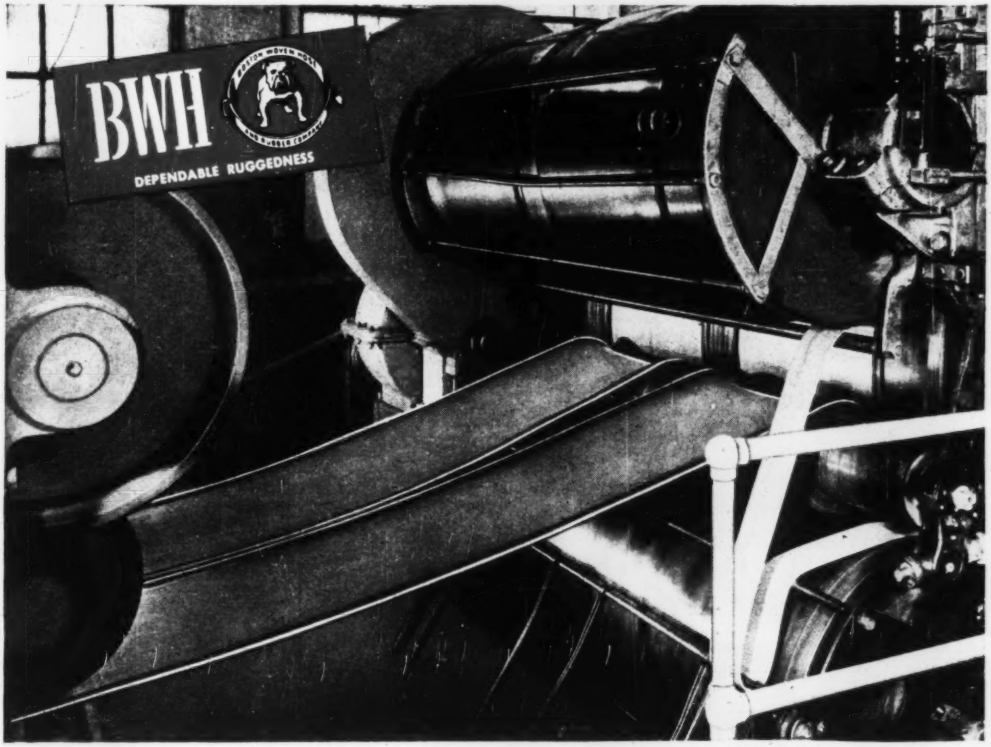

Photo Shows BWH Conveyor Belts Being Produced by the ROTOCURE Process of Continuous Vulcanization.

ONLY BWH BELTS

give you all the advantages of the ROTOCURE Process of Continuous Vulcanization

Industrial users have long recognized the potential faults in belts made by the old flat press process. By this method of vulcanizing, successive 30-foot segments of uncured belts are inserted in the flat press, stretched and vulcanized. Of necessity, the joints are overlapped in the press, resulting in overcuring. This may cause operational weakness in the belt.

15 years of tough, on-the-job testing has definitely proved that belts made by the famous ROTOCURE Process have many distinct advantages over flat-press cured belts, resulting in increased operating efficiency and lower maintenance costs.

Among these advantages are the following:

1. ROTOCURE eliminates press overlaps or overcured segments, through continuous vulcanization. Actual tests prove press overlaps may reduce flex-life as much as 40%.
2. ROTOCURE eliminates mechanical distortion, which occurs at the press ends in the flat-press method of curing.
3. ROTOCURE eliminates uneven stretch, because this process maintains constant, uniform stretch control throughout the curing of every inch of BWH Belts.
4. ROTOCURE eliminates from transmission belts, the dusting agents necessary in flat-press curing to keep belts from sticking to hot platens. Thus BWH Transmission Belts have a higher coefficient of friction, resulting in lowered operating tensions . . . prolonged belt life.
5. ROTOCURE eliminates non-uniform covers in conveyor and elevator belts, because this process never overcures any part of the belts. Thus the rubber covers of BWH Conveyor and Elevator Belts are uniformly abrasion-resistant.

HAVE YOU A JOB WHERE STAMINA COUNTS? Bring us your toughest problems . . . we're specialists in solving them. Consult your nearby BWH distributor, or write us direct.

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BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

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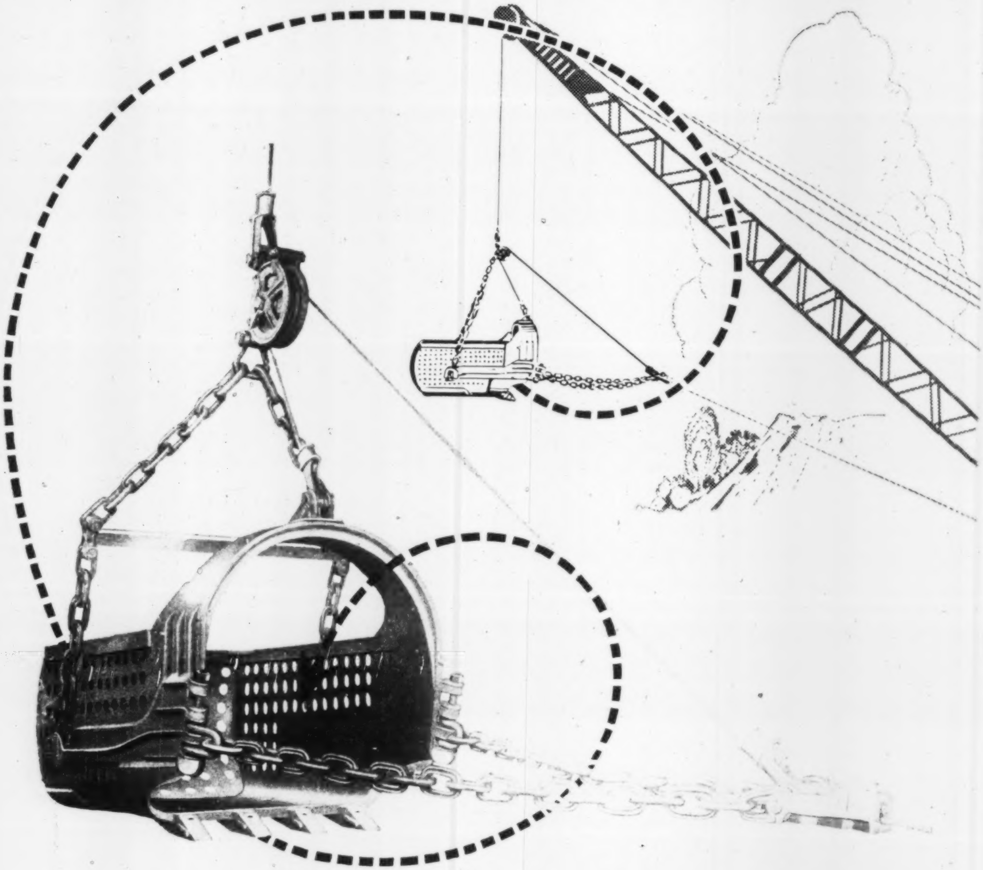


Your Profit is in your BUCKET

3 TYPES
FOR
EVERY DIGGING PURPOSE
3/8 to 40 Cu. Yds.

A full bucket every time . . . and the minimum of maintenance cost, both in dollars spent and in time consumed, will result in more profitable payloads for you. Dragline operators are becoming more and more enthusiastic over the rugged construction, full payloads, and low upkeep of Hendrix Dragline Buckets.

Hendrix Dragline Buckets are engineered by men with "know how" to give you bigger payloads at lower cost. Ask the man who uses one . . . he knows!

HENDRIX
Lightweight **DRAGLINE BUCKETS**

For descriptive literature ask your dealer or write to

HENDRIX MANUFACTURING CO., INC.

MANSFIELD — LOUISIANA

ANOTHER RAYMOND JOB FOR GULF OIL

AT PORT ARTHUR, TEXAS—Raymond is widening a marginal wharf more than half a mile long by constructing another wharf 25 feet wide along its face. This project is at the marine terminal of the Gulf Refining Company where Raymond built the first section of the existing wharf in 1911.

Today's job of constructing the 2900-foot wharf calls for the following: Concrete deck totalling 142,500 sq. ft. —requiring 4000 cu. yds. of concrete. 677 vertical piles averaging 65 ft. in length. 254 batter piles averaging 73 ft. Resurfacing 70,000 sq. ft. of existing deck. Fender system and mooring bollards along the new face.

Work progressed in 300-foot sections while docking operations continued along the rest of the wharf. This large and complex project demonstrates Raymond's ability to meet special requirements of the client.

THE SCOPE OF RAYMOND'S ACTIVITIES—includes every recognized type of pile foundation—concrete, composite, *precast, steel, pipe and wood. Also caissons, underpinning, construction involving shore protection, shipbuilding facilities, harbor and river improvements, borings for soil investigation.*

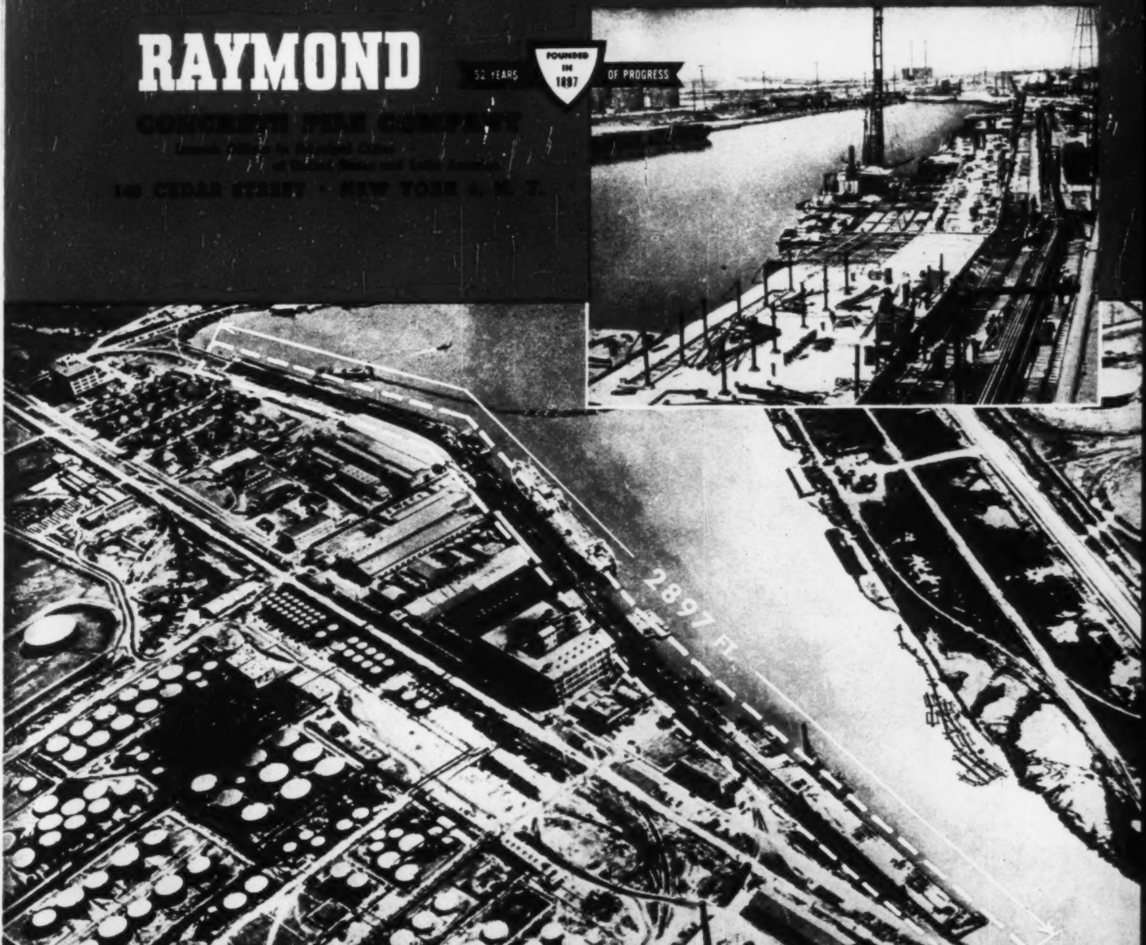
RAYMOND

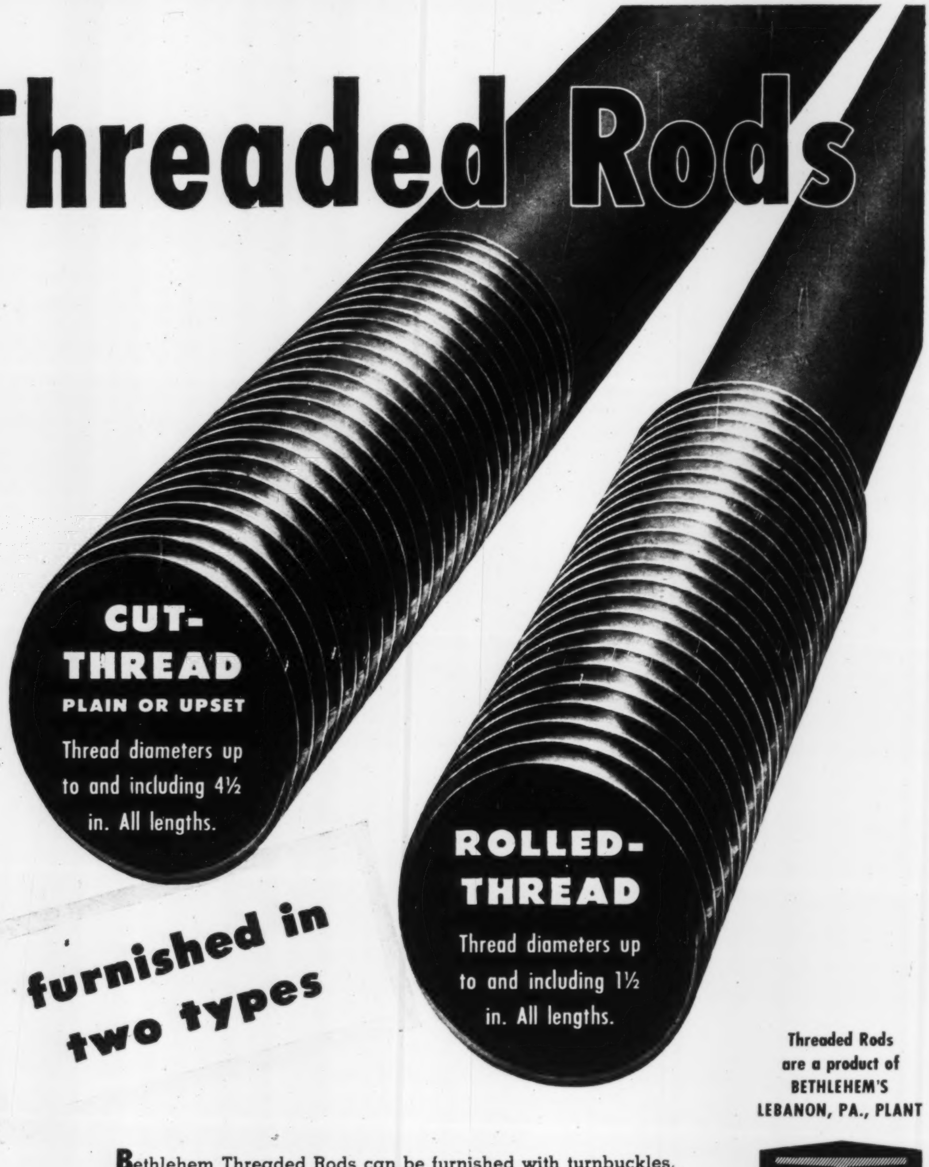
52 YEARS FOUNDED IN 1897 OF PROGRESS

CONCRETE PILE COMPANY

Branch Offices in Principal Cities
of United States and Latin America

140 CEDAR STREET • NEW YORK 6, N. Y.





Threaded Rods

CUT-THREAD
PLAIN OR UPSET
Thread diameters up to and including 4½ in. All lengths.

ROLLED-THREAD
Thread diameters up to and including 1½ in. All lengths.

furnished in two types

Threaded Rods
are a product of
BETHLEHEM'S
LEBANON, PA., PLANT

Bethlehem Threaded Rods can be furnished with turnbuckles, clevises, nuts or other accessories. They come straight or bent, in single or multiple units, asphaltum-dipped or hot-dip galvanized. Prompt deliveries are the rule. Get in touch with us for details.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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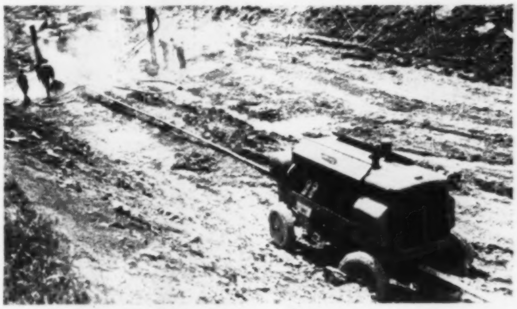
BETHLEHEM STEEL

Bethlehem supplies every type of Fastening

Wouldn't YOU look happy,

doing 4 days' drilling in 3?



On an excavation contract for 1,600,000 yards of approximately 60% limestone and sandstone rock, on U. S. Route 22 east of Pittsburgh, Ralph Myers Construction Co. replaced a good 500 ft. compressor with a "new standard" Jaeger 600 and immediately increased daily footage 35% to 40% with the same two wagon drills.

"I'm doing as much drilling in 3 days as I used to do in 4," says Ralph Myers, who now owns two Jaeger 600's.

Why? Because tools need more air today than they did back in 1932, when the old 60 to 500 ft. compressor ratings were established. 500 ft. of air maintains only 70 lbs. pressure behind two big wagon drills; with 600 ft. you step up pressure to a steady 90 lbs. at which drills will average as much as 40% more footage per hour.

You can get a comparable increase in production with any "new standard" Jaeger Air Plus. From the Model 75, that holds 90 lbs. pressure in a heavy pavement breaker, on up, every Air Plus rating is matched to the tools it is designed for. Ask any Jaeger user. Or go to your distributor who sells and rents "Air Plus" compressors and let him prove it on your job.

75 - 125 - 185 - 250 - 365 - 600 cfm at 100 lbs.

Why you can't match Jaeger ratings with any other compressor:

Jaegers, alone, have been designed with the much bigger valves, port areas, intercoolers, air receivers and clutches, the balanced 2-stage compression and advanced force feed lubrication needed to convert the greater horsepower of today's engines into more air power, at efficient, economical engine speeds. They had to be run at 20% to 30% slower piston speed than others (800 fpm) to hold them down to old ratings until modern engines became available in diesel to match gas.

NOTE: Because of "Fuel Miser" speed control, Jaegers use no more fuel than others when not delivering more air.

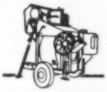
THE JAEGER MACHINE CO., Columbus 16, Ohio

JAEGER

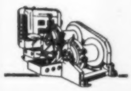
engineered equipment

COMPRESSORS • DIAGONAL SCREED FINISHERS
SCREW SPREADERS • BITUMINOUS PAVERS

PUMPS



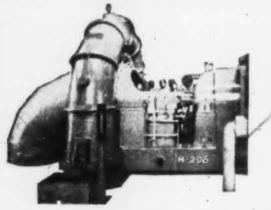
MIXERS



HOISTS

Gas Plants

by people who also build appliances



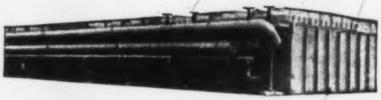
ROOTS-CONNERSVILLE—CENTRIFUGAL EXHAUSTER

Positive Meters—*Roots-Connersville*
Blowers—*Roots-Connersville*
Purifiers—*Stacey Bros.*
Exhausters—*Roots-Connersville*
Meters—*Roots-Connersville*
Condensers—*Stacey Bros.*
Scrubbers—*Stacey Bros.*
Compressors—*Clark*
Pumps—*Pacific*
Oxygen Plants—*Stacey-Dresser Engineering*
High-Pressure Storage—*Stacey Bros.*
Liquid Propane Gas Plants—*Stacey-Dresser Engineering*

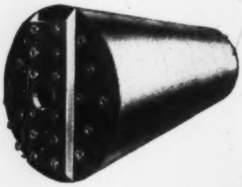
Compressors and blowers and holders and scrubbers are things sold by several makers to put in a plant for manufacturing gas.

What Dresser Industries offers you is the knowledge of the gas industry from the sale of furnaces right back through the pipe lines, through the compressors and blowers into the realm of research for better ways of making gas.

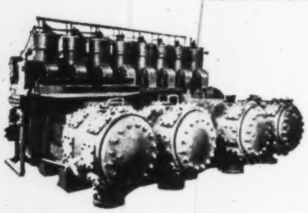
This means to you that the purchase of equipment from any of the companies grouped under Dresser Industries, Inc., opens to you engineering information of the whole group. Each of the Dresser companies is a specialist in some type of equipment. As a group they can provide a great many alternate types of similarly purposed equipment—reciprocating or centrifugal or rotary positive. So it is not necessary for a Dresser salesman to compromise engineering for the sake of a sale.



STACEY BROS.—PURIFYING EQUIPMENT

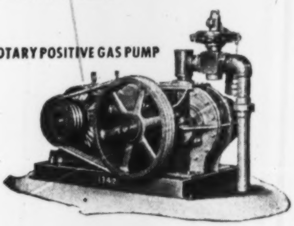


STACEY BROS.—SCRUBBERS



CLARK—COMPRESSORS

ROOTS-CONNERSVILLE—ROTARY POSITIVE GAS PUMP



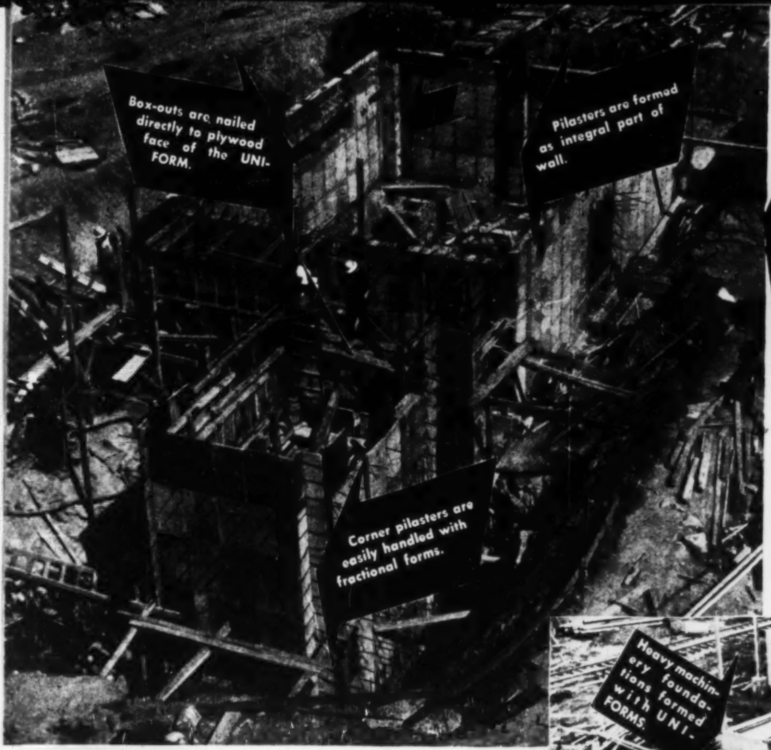
DRESSER INDUSTRIES, INC.
TERMINAL TOWER • CLEVELAND 13, OHIO

Matched Equipment Matchless Service

BOVAIRD & SEYFANG Mfg. Co.
Bradford, Pa.
BRYANT Heater Company
Cleveland, Ohio; Tyler, Texas
CLARK Bros. Co., Inc.
Olean, New York
DAY & NIGHT Mfg. Co.
Monrovia, Calif.
DRESSER Mfg. Division
Bradford, Pa.
DRESSER Mfg. Company, Limited
Toronto, Ont., Canada
INTERNATIONAL Derrick & Equipment Co.
Beaumont & Dallas, Texas; Torrance, Calif.;
Columbus, Marietta & Delaware, Ohio

KOBE, Inc.
Huntington Park, Calif.
PACIFIC Pumps, Inc.
Huntington Park, Calif.
PAYNE Furnace Co.
Beverly Hills, Calif.
ROOTS-CONNERSVILLE Blower Corp.
Connersville, Ind.
SECURITY Engineering Co., Inc.
Whittier, Calif.
STACEY BROS. Gas Construction Company
Cincinnati, Ohio
Stacey-Dresser Engineering Division
Cleveland, Ohio

ONLY UNI-FORMS COULD DO THIS JOB!



Box-outs are nailed directly to plywood face of the UNI-FORM.

Pilasters are formed as integral part of wall.

Corner pilasters are easily handled with fractional forms.

Contractor: NATIONAL CONCRETE FIREPROOFING CO.
1220 Terminal Tower, Cleveland, Ohio

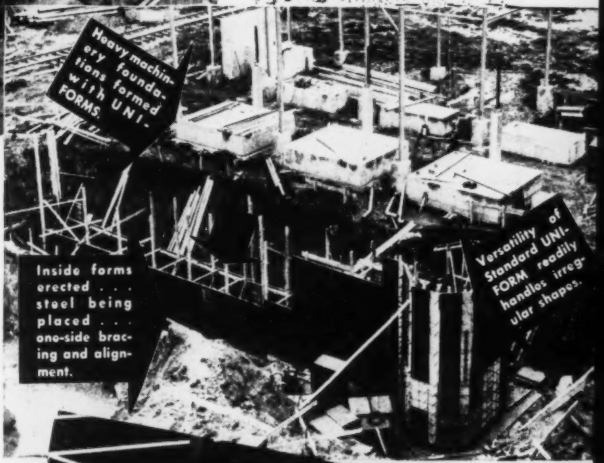
Only UNI-FORMS—the versatile, easy to use prefabricated wall forms—could handle the many special forming requirements necessary on this job.

Standard UNI-FORMS were used throughout to form offsets, brick ledges, box-outs, pilasters, slabs, machinery bases, irregular walls, etc.

Builders everywhere are using the Uni-Form System of Wall Form Construction . . . its versatility, economy, ease of use and the fast start and finish provide lowest all-around cost.

RENT UNI-FORMS WITH AN OPTION TO PURCHASE

Let us show you how we can cut your costs. Send us a set of plans for an estimate.



Heavy machinery foundations formed with UNI-FORMS.

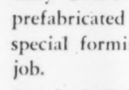
Inside forms erected . . . steel being placed . . . one-side bracing and alignment.

Versatility of Standard UNI-FORM readily handles irregular shapes.

Simplified slab forming — just lay UNI-FORMS on joists.

UNI-FORMED foundation. Note brick ledge, sharp, accurate corners.

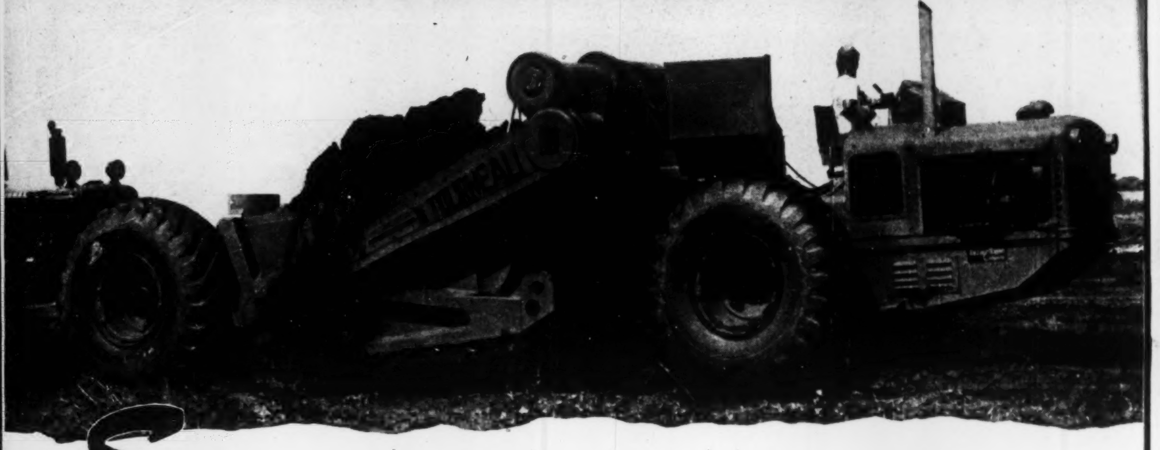
Over 5,000,000 square feet Now in Use



UNIVERSAL
Form Clamp Company
Founded 1912
1238 N. Kostner • Chicago 51

SEND FOR OUR LATEST CATALOG

"C" TOURNAPULLS move



Sager Construction Co. PUT 2 "C's" ON JOB... LIKED PERFORMANCE...ORDERED 2 MORE

Dirtmoving operations really shifted into "high gear" when two high-speed, electric-control C Tournapulls moved onto 125,000-yard Jacksonville, Illinois airport.

Average 11 trips an hour on 1600′ one-way haul

A check on typical Tournapull production showed that each rig, working in loamy top soil and clay, easily maintained an average of 11 loads an hour on 1600′ one-way haul. Sager Construction Company worked them 10 hours a day . . . liked their consistent yardage output . . . ordered 2 additional C Tournapulls.

Supt. "sold" on the "C's"

"On 1600 foot haul they made 2 trips to a crawler's one," reported L. U. Steinhoff, job superintendent. "They've got plenty of power, too . . . almost load themselves in our topsoil. And their electric tailgate motor gives a smoother spread than PCU's . . . pushes dirt out better . . . more positive."

Operators enthusiastic

One of Sager's Tournapull operators, B. W. Beecraft, had this to say: "Electric control sure makes operation easy . . . 90° steering lets you get away fast in cut and on fill. I like that transmission, too . . . don't have to fool around with clutch . . . have quick get away."

You'll like them, too

There are a lot of reasons why these modern, 150 h.p. C Tournapulls are making a big hit with owners and operators like Sager Construction Company. This 16-ton-capacity dirtmover has all the features you've been wanting . . . 4 fast hauling speeds to 17.3 m.p.h. . . . constant-mesh transmission for instantaneous speed selection with no loss of momentum . . . power-proportioning differential for extra lugging power. You also get positive electric power steer . . . simple, finger-tip electric controls, and many other "exclusives" for faster operation and more yards per hour.

If you haven't tried these profit-making C Tournapulls on your job, see your local LeTourneau Distributor right away. There's a *new* "lowest net cost per yard" in store *for you.*

LETOURNEAU LeT EQUIPMENT

See your LeTourneau Distributor NOW for complete information

2300 yds. per day on 1600′ haul

Loads in 45 seconds...

Push-loaded Tournapulls wasted no time in cut . . . heaped 10 pay yards of loamy topsoil in ¾ minute . . . 65′ loading distance.

Gets away fast...

Instant speed selection gave quick acceleration out of cut . . . quick take-offs got heaped-loaded Tournapulls rolling fast.

Hauls up to 17.3 mph...

Except for occasional rough spots on haul, Sager's Tournapulls smoothly stepped into "high" . . . cut travel time between cut and fill.

Spreads in 15 seconds

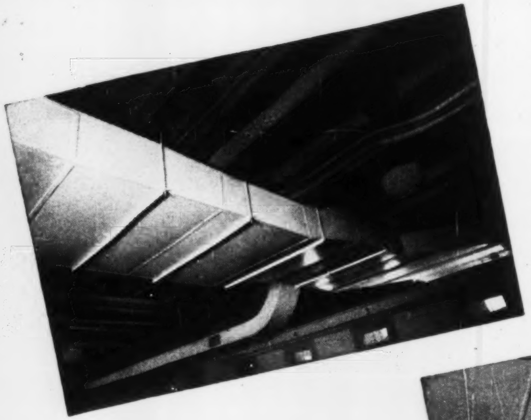
Average round-trip time for 3200′ cycle of load, haul, spread and return was 4.4 minutes.

Tournapull — Trademark Reg. U. S. Pat. Off. R140

LETOURNEAU HIGH-SPEED RUBBER-TIRED **TOURNAPULLS**

PEORIA, ILLINOIS

MORE YARDS PER HOUR WITH RUBBER-TIRED POWER



Warm air duct constructed of Apac.

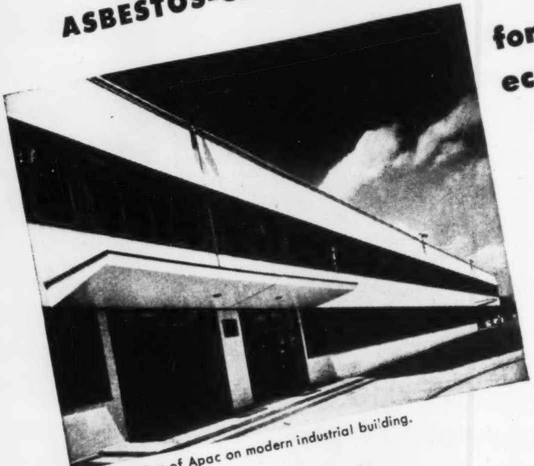
Apac ceiling on industrial-type cafeteria.

Here... there...
and everywhere

K&M "Century" APAC

ASBESTOS-CEMENT SHEETS

for fire-resistant ... durable ... economical construction



Exterior siding of Apac on modern industrial building.

You get long-lasting, economical construction when K&M "Century" Apac board is specified for new building, renovations or as a replacement material.

That's because Apac is made of tough asbestos fibers and Portland cement—a hard-wearing combination that resists fire, rodents, termites, rot, rust and weather. And Apac actually improves with age.

"Century" Apac is economical on any job. Initial cost is surprisingly low. Installation costs are low because Apac is easy to cut — just score it, and snap off; easy to apply—fastens in place with nails or screws; and easy to handle—comes in sheets 4'x 8' and in thicknesses of 3/16", 1/4" and 3/8".

For further information on how "Century" Apac can help solve your special problems, write direct to us. Your inquiry will receive prompt attention.

K&M best in asbestos

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

Provo Brothers, Syracuse, N. Y., recently completed a $906,000 contract on State Highway #12 between Remsen and Boonville, Oneida County, N. Y. Gulf lubricants helped keep equipment operating smoothly and efficiently on the job.

PROVO BROTHERS INC.
NORTHWEST

"Our equipment stands up longer, delivers better performance with GULF QUALITY LUBRICANTS"

says this Contractor

Provo Brothers of Syracuse, New York, is one of many leading contractors who have found that better lubrication with Gulf quality oils and greases is reflected in the operating records of equipment.

Engineered into Gulf lubricants is greater stability and endurance—they stand up and provide better protection to contractors' equipment under all types of operating conditions. Mud or dust—hot or cold, Gulf lubricants insure top-notch performance and a minimum of mechanical delays.

It will pay you to use Gulf quality lubricants on your next contract. Ask a Gulf Lubrication Engineer to recommend the proper types and grades exactly suited for your particular requirements.

Gulf Oil Corporation • Gulf Refining Company
Division Sales Offices:
Boston • New York • Philadelphia • Pittsburgh • Atlanta
New Orleans • Houston • Louisville • Toledo

GULF

DIGGING IN *or* DIGGING OUT

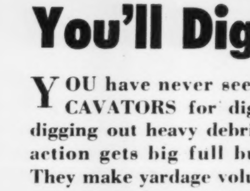
TRAXCAVATOR
Diesel

You'll Dig Better with TRAXCAVATORS!

YOU have never seen anything like TRAXCAVATORS for digging in tough soils or digging out heavy debris. Their direct digging action gets big full bucket loads every time. They make yardage volume go up and handling costs come down.

TRAXCAVATORS are big, powerful tractor-excavators powered by famous sure-footed "Caterpillar" track-type tractors. They are contractors' most versatile tools. They dig, grade, load, carry, haul, lift, spread and bulldoze — and they do it cheaper and faster than any other machines of comparable size and capacity.

There's a size of TRAXCAVATOR for every job and purpose . . . with bucket capacities ranging from ½ to 4 cubic yards. For detailed information on how TRAXCAVATORS can help you — see your friendly TRACKSON "Caterpillar" dealer or write to the TRACKSON COMPANY, Dept. EN-19, Milwaukee 1, Wisconsin.



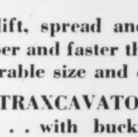
DIGS

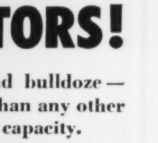
GRADES

TRAXCAVATOR

REG. U. S. PAT. OFF.

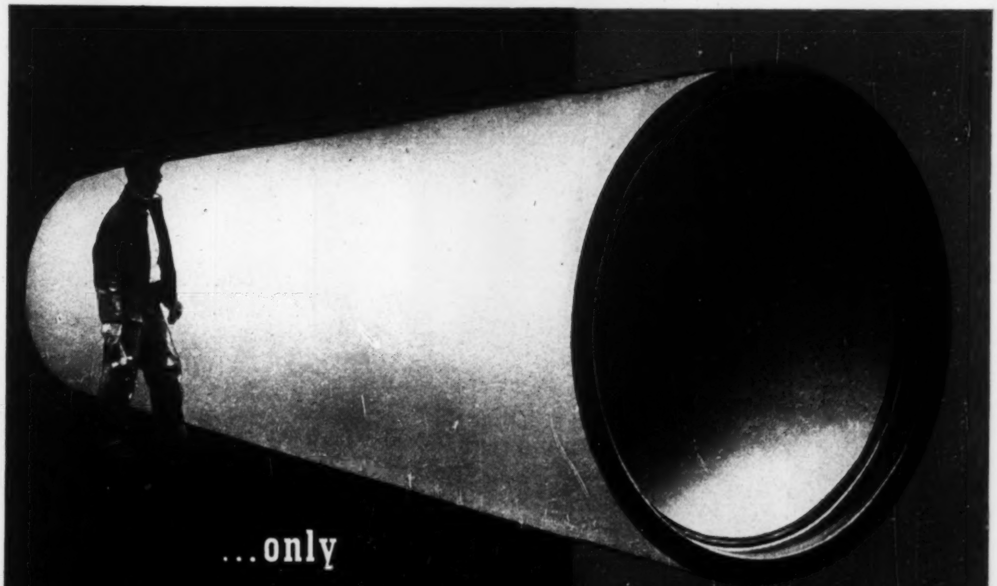
THE ORIGINAL TRACTOR EXCAVATOR





LOADS

CARRIES



...only

LOCK JOINT

offers

all 8 of these advantages

Each of these characteristics is essential to a good water supply line, and Lock Joint Reinforced Concrete Pressure Pipe alone offers ALL 8 OF THESE ESSENTIAL QUALITIES.

1. Life Expectancy of Over 100 Years
2. Freedom from Corrosion, Tuberculation and Electrolysis
3. Sustained High Carrying Capacity
4. Freedom from Ruptures, Blowouts or Leakage
5. Ability to Withstand [illegible] [illegible] and Earth Loads
6. Designed to Any Pressure Common to American Water Works Practice
7. Low Initial Cost and Minimum Maintenance Charges
8. Expansion Joints Installed with Maximum Ease and Economy

LOCK JOINT PIPE COMPANY

Est. 1905

P.O. Box 269, East Orange, N. J.

PRESSURE PIPE PLANTS: Wharton, N. J. • Turner, Kan.

BRANCH OFFICES: Cheyenne, Wyo. • Denver, Colo. • Kansas City, Mo. • Joplin, Mo. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn.

SCOPE OF SERVICES: Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

POWER!

PRODUCING
AGGREGATE

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

INTERNATIONAL

INTERNATIONAL

MOVING EARTH

INTERNATIONAL ENGINES — **powering tractors or power units—deliver rugged, low-cost power that cuts operating costs to rock bottom.**

Producing aggregate the International UD-18A is one of three International Power Units driving a rock crusher. The low operating cost of these power units is an important factor in profitably meeting the competitive price of crushed stone.

Moving earth to clear the way for a hospital addition is the task of the International TD-18 Diesel Crawler and matched scraper. Averaging 120 yards per hour, the TD-18 did a fast, profitable job of moving a total of 10,000 yards.

You just can't beat International Power for peak production and low operating and maintenance costs. Visit your International Industrial Power Distributor and let him show you how International Tractors and Power Units will produce more profits on your projects.

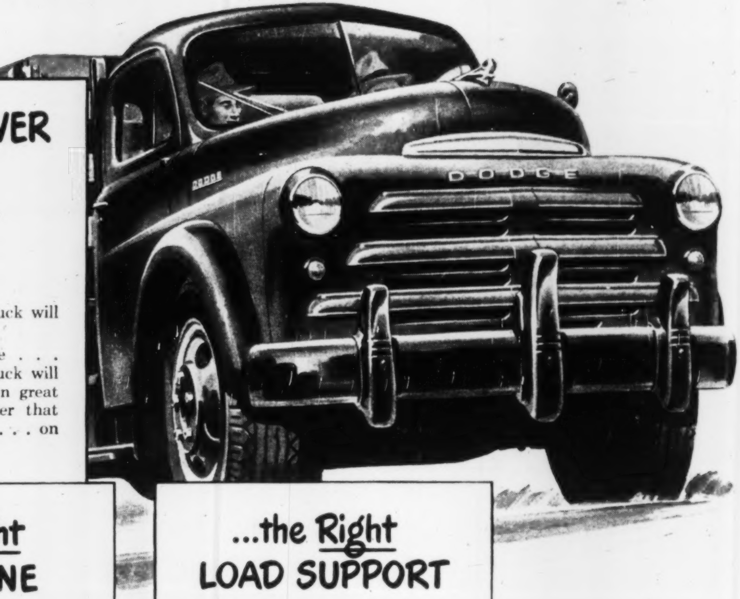
INTERNATIONAL HARVESTER COMPANY • CHICAGO

Listen to James Melton on "Harvest of Stars" every Wednesday evening—CBS

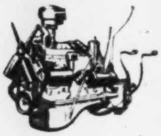
INTERNATIONAL HARVESTER

Industrial Power

Here's what "Job-Rated" means to you...



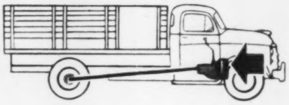
the Right POWER



"*Job-Rated*" means your truck will have the right power.

For maximum performance . . . with economy . . . your truck will have the right one of seven great Dodge truck engines. Power that fits your job saves money . . . on gas, oil, and upkeep.

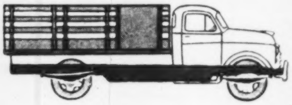
...the Right DRIVE LINE



"*Job-Rated*" means your truck will have the right driving units: Clutch, transmission, rear axle, gear ratio . . . and other load-*moving* units.

You get more efficient performance. Your truck stays *on the job* . . . lasts longer.

...the Right LOAD SUPPORT



"*Job-Rated*" means the right support for your load. Frames, axles, springs, bodies, wheels and tires—all are the right size for the weight of your truck . . . and the load it hauls. Result: Your truck "stands up" . . . maintenance costs are low.

... in short, the Right truck to fit your job!

To get a "*Job-Rated*" truck, see your Dodge dealer.

Tell him three things: (1) The weight of the loads you haul; (2) the type and size of body you need; and (3) your grade and speed requirements.

From 248 basic chassis models, your Dodge dealer will specify a "*Job-Rated*" truck that fits your job. Every unit . . . from engine to rear axle . . . will be "*Job-Rated*" . . . engineered and built for your loads.

Such a truck will save you money . . . when you buy it, and every mile you use it. In addition to economy of operation, it will give you dependability, and long, trouble-free life. And remember . . . only Dodge builds "*Job-Rated*" trucks!

DODGE "Job-Rated" TRUCKS

FIT THE JOB . . . LAST LONGER

For the Location of the Dodge Dealer in Your Community, Consult Yellow Pages of Your Phone Directory

Outsize

to point up a fact about valves, cost-wise

No ship was ever fitted with a valve this big. We took broad liberties with proportion in this picture because a valve's size can be misleading. In comparison with larger plant units, the cost of a single valve seems a minor, "petty cash" investment. But if, as here, *all* the valves could be viewed as *one* valve, you would see that valves actually represent a *major* expenditure.

In any plant, any building where operation involves fluid control, it pays management to keep this "collective" valve in mind. These days, especially. You pay more than ever today, in wages and material costs, for every operation in your plant — including valve maintenance.

Excessive maintenance of one inferior valve is insignificant, but multiplied by *thousands*, it is a serious drain on operating budgets.

Jenkins Bros. helps you meet this problem. In *two* ways. One, by building extra endurance into Jenkins Valves. They are the longest-lasting, lowest-upkeep valves that money can buy. Two, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering for lowest valve costs in the long run. *Sold through leading Industrial Distributors.*

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

LOOK FOR THIS DIAMOND MARK

SINCE Jenkins Bros 1864

JENKINS VALVES

Types. Sizes. Pressures. Metals for Every Need

"PREVENT VALVE FAILURE" is a 28-page guide to valve economy, fully illustrated, with case histories of valve damage, and recommendations for its prevention by proper selection, installation, inspection, and maintenance. FREE on request. Write JENKINS BROS., 80 White St., New York 13, N. Y.

NOW 18.5 m.p.h. Trenchmobile

Utility-size TRENCHER *on rubber*

Here is a mobile, utility-size trencher — Parsons rubber-tired Model 80 Trenchmobile — for handling off-street connections, installing conduit, gas lines, water services, in new subdivisions, on airport maintenance, etc. All those small, tedious trenching operations formerly done by slow, costly hand methods can now be handled in much less time, at less cost, and less supervision with this one-man operated Trenchmobile. Opens new profit possibilities to small contractors . . . fills an important need in speeding up schedules of public utilities and municipalities.

TRAVELS A MILE IN 4 MINUTES

This revolutionary pneumatic-tired Trenchmobile goes anywhere under its own power . . . over city streets . . . through traffic . . . down the highway at road speeds. No waiting for truck or trailer. You just drive it away . . . travel a mile in less than 4 minutes! Gets there faster . . . gets to work sooner . . . finishes quicker.

HANDLES MORE JOBS PER DAY

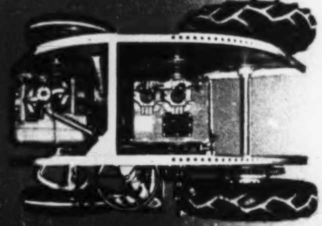
Trenchmobile's wide range of traveling and trenching speeds gets more jobs done per day. Cuts smooth-walled trenches in the toughest digging . . . special crumber attachment provides clean trench bottom. No costly hand trimming. Over 40 years of Parsons trencher engineering experience has gone into its rugged, heavy-duty design . . . trenches up to 4-feet deep, 5" or 7½" wide. Check what its many exclusive features can mean to you . . . then see your Parsons distributor for complete facts, or write for illustrated bulletin.

KOEHRING PRODUCT

PARSONS *Trenchmobile*

MANUFACTURERS OF 4 BIG HEAVY DUTY TRENCHLINERS© FOR YOUR MAJOR TRENCHING

Model 80



FACTS AT A GLANCE:

- ✓ 4 TRAVEL SPEEDS to 18.5 m.p.h., plus 2.36 m.p.h. reverse
- ✓ 6 DIGGING SPEEDS from 2.16 to 13.22 ft. per min.
- ✓ DIGS TO 4 FT. DEEP . . . 5" or 7½" wide
- ✓ GROUND-GRIP TIRES . . . 9 x 24 rear . . . and 6.50 x 16 front
- ✓ AUTOMOTIVE-TYPE STEER . . . truck-type hydraulic brakes
- ✓ OVERALL WIDTH 4'-11" . . . 4'-6" wheelbase
- ✓ 24 H.P. ENGINE gas, air cooled
- ✓ WEIGHS APPROX. 5,000 Lbs.

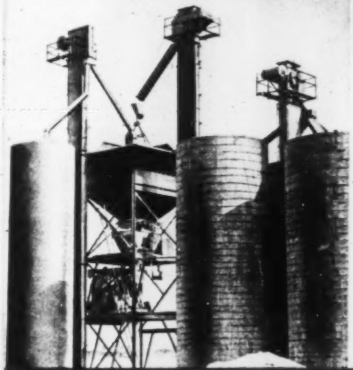
PARSONS COMPANY
NEWTON, IOWA
KOEHRING SUBSIDIARY

CP908

MOTO-BUG has power forward AND REVERSE

Low-cost, big-capacity Kwik-Mix Moto-Bug gives you: Forward *and reverse* speeds from 1½ to 4 m.p.h. Extra capacity per load . . . 10 cu. ft. (1200 lbs.). Easy handling . . . steers by hand-lever connected direct to rear wheel. Handy 33" width for close quarters . . . turns in own length. *Standard-make* 3.9 h.p. air-cooled gasoline engine. Platform body with stake pockets available.

KWIK-MIX COMPANY
Port Washington, Wis.
KOEHRING SUBSIDIARY



CENTRAL-MIX PLANTS with 100,000,000 yds. of experience

Over 100,000,000 cu. yds. of concrete have been poured by Johnson-engineered Central Mix plants . . . experience available to *you* for top efficiency. Central Mix Plant, illustrated, has 120-yd. Step-by-Step Bin . . . aggregate and cement elevators, storage silos, big 56-S concrete mixer. Ask about other Johnson sizes and types to fit *your* central-mix plant problems . . . large or small.

C. S. JOHNSON COMPANY
Champaign, Ill.
KOEHRING SUBSIDIARY

KOEHRING 205 works on grade without blocking

Basement digging is a half-yard job. Koehring 205 breaks ground fast, works well on inclines because . . . Koehring traction brakes, controlled from cab, securely hold both crawlers without blocking . . . provide flexibility necessary to cushion brake assembly against operating shocks. Versatile half-yard saves time, money and increases production in many other ways. Write for catalog.

KOEHRING COMPANY
Milwaukee 10, Wis.

ALL OVER THE COUNTRY THEY'RE DIGGING "IN THE DRY"

OUTLET TUNNEL — LONG BEACH, CALIF.

RELIEF SEWER — BROOKLYN, N. Y.

BUILDING FOUNDATION — MOBILE, ALA.

with MORETRENCH WELLPOINT SYSTEMS

Sewers in Minnesota . . . pump stations in New Jersey . . . river crossings in Texas . . . foundations in North Dakota . . .!

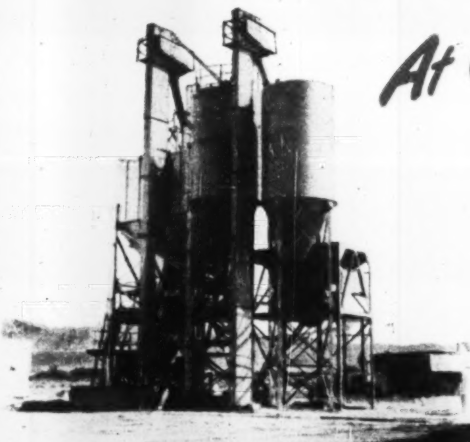
Why do so *many* contractors in so *many* states on so *many* different types of jobs invariably select MORETRENCH when they have a pumping problem?

The reason is simply this: MORETRENCH gives results—quickly—at a low *final* cost.

When you're figuring a wet job, figure it with ***MORETRENCH.***

MORETRENCH CORPORATION

90 West St. New York 6	3037 S. Christiana Ave. Chicago 23, Illinois	7701 Interbay Blvd. Tampa 9, Florida	315 W. 25th St. Houston 8, Texas	Rockaway New Jersey



At Coachella Valley

Lower Cost of Delivered Pipe Means Savings in Cost of Delivered Water

The enormous cost of transforming a remote desert wasteland into a productive agricultural area is justified largely by the ultimate and reasonable cost of delivered water per unit of irrigated land — and this cost is intimately related to the cost and quality of pipe delivered to the job-site.

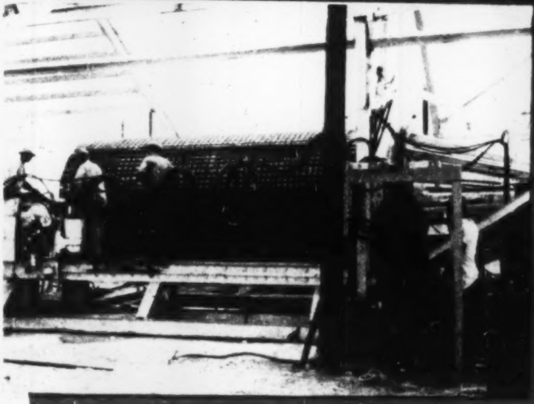
The construction of Unit No. 1 of the Coachella Valley Distribution System (designed by the U. S. Bureau of Reclamation) is another example of this Company's ability to contribute to the lower cost of delivered water.

The Facilities—

An integrated and efficient near-by plant is equipped to handle all operations from the storage of cement and aggregate to the curing, yarding and installation of finished pipe.

The Know-How—

Operation of these facilities is backed by more than 40 years experience in the manufacture of reinforced concrete pipe. The Company has contributed importantly to the development and improved quality of concrete pressure pipe for all fields of water transmission.



The Result—

A superior concrete pressure pipe of proven design. Unit No. 1 will consist of some 37,000 feet of Lock Joint Pressure Pipe, manufactured to exacting specifications. Lock Joint Rubber Gasket Joints assure positive closure. Smoothness of interior surface assures maximum hydraulic capacity — permanently sustained. Of equal importance to savings in initial cost is the assurance that this quality pipe will permanently give maximum, trouble-free service.

American
PIPE AND CONSTRUCTION CO.

Concrete Pipe for Main Water Supply Lines, Storm and Sanitary Sewers, Subaqueous Pipe Lines.

P. O. Box 3428, Terminal Annex • Los Angeles 54, California

QUALITY PIPE LINE PRODUCTS MANUFACTURED AND INSTALLED BY AMERICAN INCLUDE . . . LOCK JOINT CONCRETE CYLINDER PIPE, AMERICAN CONCRETE CYLINDER PIPE, PRESTRESSED LOCK JOINT CONCRETE CYLINDER PIPE, CENTRIFUGAL CONCRETE PRESSURE PIPE.

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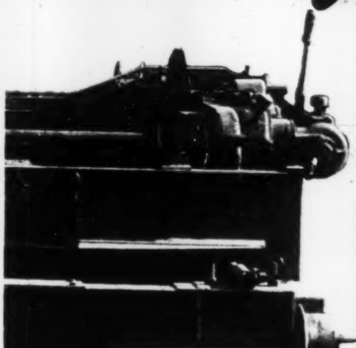
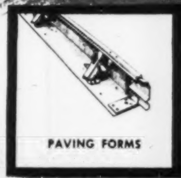
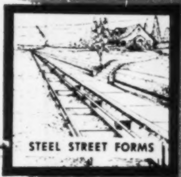
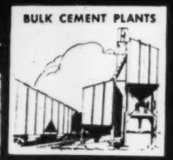
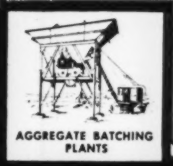
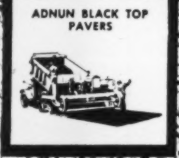


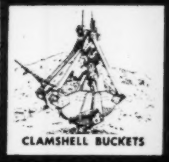

PAVING FORMS


STEEL STREET FORMS

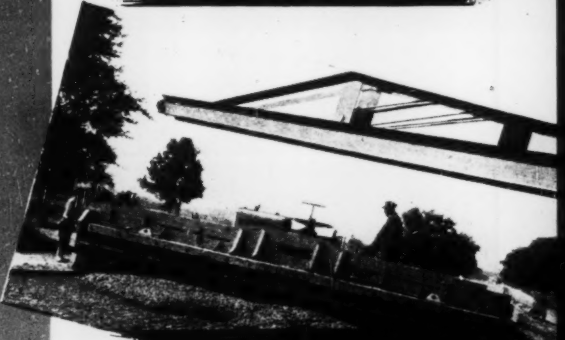

BULK CEMENT PLANTS


AGGREGATE BATCHING PLANTS


ADNUN BLACK TOP PAVERS

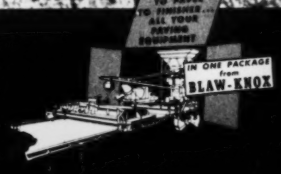

CLAMSHELL BUCKETS

A MULTIFOOTE 34-E DUOMIX PAVING MIXER with its fast charge and discharge gets the concrete on the subgrade in a hurry. The Elevating Boom makes the MultiFoote an all-round high-speed construction tool that will eliminate extra equipment and high costs in the pouring of forms.



A BLAW-KNOX CONCRETE PAVING SPREADER can automatically spread the harsh, dry mixes of two 34-E dual drum pavers no matter where the concrete is placed on the subgrade between forms.

A BLAW-KNOX FINISHING MACHINE following a Blaw-Knox Spreader will give you record smashing production and highest quality of finish of concrete pavement regardless of the type of concrete mix specified or required.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GREEN, JAMES & MEADOWS, Buffalo, N. Y.
General Contractor: **RING CONSTRUCTION COMPANY,** Minneapolis, Minn.
Lone Star and 'Incor' Concrete supplied by:
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Concrete Contractor: **FOSS-HALLORAN-NARR, INC.,** Long Island City, N. Y.

Speeds Cold-Weather Concreting on Great New Veterans Hospital

ONE of the nation's most modern hospitals is being pushed to completion for the Veterans Administration at Albany, N. Y. This 14-story, 1000-bed hospital, on a 25-acre site, is part of a nationwide hospital construction program designed to provide adequate care for disabled veterans.

The fireproof structure, with its nearly 17 acres of floor space, employs the cruciform plan of a central core with four wings.

In concreting the floors, Foss-Halloran-Narr, Inc., Concrete Contractors, switched from Lone Star Cement to 'Incor' 24-Hour Cement last Fall, as soon as cold weather threatened to slow down schedules. By providing maximum strength-gaining efficiency, 'Incor' made it possible to strip forms a week sooner — keeping the job on schedule and offsetting risk of freezing. Result, three wings and the core were concreted by December 1, instead of only one wing.

Use 'Incor'* for either concrete frame, or steel skeleton with concrete floors and fireproofing... keep job speed up and job costs down... flatten out that curve of rising building costs.

*Reg. U.S. Pat. Off.

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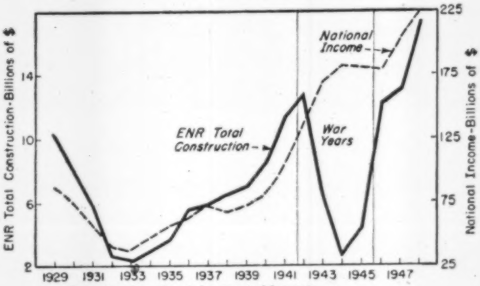
CONSTRUCTION TRENDS

Prospects for General Business Reinforce Construction's Outlook



Data Engineering News-Record, Department of Commerce
Mc Graw-Hill Department of Economics, 1948 Estimated

The boom in general business promises to run on well into 1949—in spite of conspicuous sagging in some lines.

This prospect for business as a whole reinforces ENR's forecast for construction that 1949 would be an even bigger year than 1948 was.

As the chart shows, construction has boomed when business has boomed in the past.

Industrial production and employment promise to run on at a high level in the first half of 1949. Steel and electric power production set new records in December. Unemployment is still close to its minimum, and, despite reports of layoffs in many areas, it showed no signs of increasing markedly. Moreover, demands of the military and foreign relief programs are increasing. The automobile industry hopes to top all past production records in 1949, if it can get enough steel. Business in general seems to have enough momentum to carry it on in high gear well into the summer.

This outlook is fortified by preliminary results of the McGraw-Hill survey of business plans to buy new plants and equipment in 1949. It shows business plans now to spend almost as much as it spent last year—more than $18 billion. This investment by business is an important prop under prosperity, for the heavy equipment industries that depend on it employ about one-third of all U.S. industrial workers.

Standing out in the 1949 outlook, however, are two important points:

Inflation is petering out. Although industrial prices are still rising slowly, farm and other prices are falling. Prices, as a whole, promise to level off and become stable in 1949.

Competition—the old-fashioned, prewar kind—will be back in many businesses. Even though business as a whole has a very good prospect, the all-out boom is past. Prosperity in '49 promises to be more like what it was in the mid-1920's. Even though the economy as a whole is prospering, some lines of business will run into rough going.

Government action can make or break business in the year ahead. Business boomed right after the war, no matter what the government did. Last year, the tax cut, European Recovery Program, and increasing military spending added strength. But next year, with business balanced between inflation and deflation, government action could make all the difference. It could slow up business in the second half, for example, if heavier taxes cut down business's ability to buy new plants and equipment. Or a big increase in military expenditures could bring another dose of inflation.

These things—if they develop—would be felt late in the year, however. And, even if business softens in the fall, the year as a whole may well see new altitude records.

Construction will feel all these things that influence business in general.

The fact that people's incomes are rising, and probably will go still higher as full employment continues and another round of wage increases come in, means that demand for housing will be stimulated. On the other hand, the pre-Christmas retail slump suggested that people want better values for their money. That may mean that homebuilders in some areas will have to adjust prices to keep their volume close to the 1948 level.

Commercial building, in general, is increasing. It will benefit from the return of competition. Retailers across the country will be under pressure to modernize in order to cut costs and make their stores more attractive to customers.

High business activity, too, means that the railroads will have money to continue their programs. Utilities are expected to speed-up their long-range expansion work. Industrial construction, which has been declining, may fall off again mildly. But with good business continuing, it will probably total almost as much in 1949 as in '48.

All in all, the business outlook reinforces ENR's forecast of another big year for private construction. Privately financed work in 1949 promises to be as good, or better, than in '48.

With public works expected to rise from $4 billion last year to $5 billion this year, construction goes into the new year with bright prospects.

You can't see the most important item

QUALITY isn't listed on the assembly drawing; but it *is* built into every W&T Chlorinator. It's there because neither you nor we want to take chances with the protection of public health—one of chlorination's important roles in water supply, sewage treatment and swimming pools. In their many industrial uses, too, from controlling slime in paper mills to preventing spoilage in food processing, you'll find this same craftsmanship and careful manufacturing—the kind that keep W&T chlorinators on the job economically year after year.

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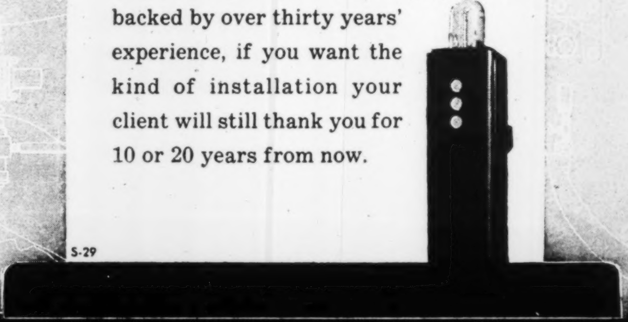
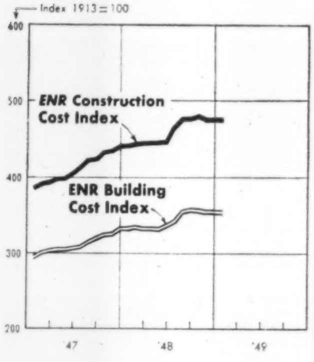
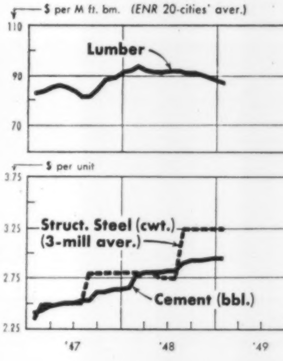
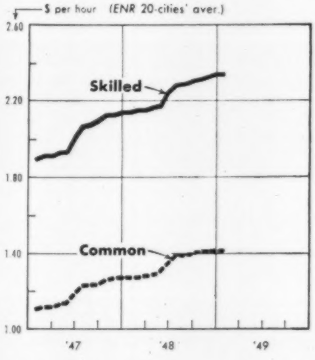


JANUARY CONSTRUCTION BUSINESS REPORT







ENR INDEXES (1913 = 100)	Jan. '49	Dec. '48	% Change	Jan. '48	% Change
Construction Cost	477.41	477.66	−0.1	441.65	+ 8.1
Building Cost	354.91	355.55	−0.2	333.58	+ 6.4
MATERIALS PRICES (20-cities' average)					
Cement, bulk, per bbl	$2.960	$2.960	0.0	$2.670	+10.9
Structural Steel, base, per cwt	3.250	3.250	0.0	2.800	+16.1
Sand, per ton	2.067	2.042	+1.2	1.905	+ 8.5
Lumber, 2x4 Fir, per M ft. bm	94.630	95.610	−1.0	97.340	− 2.8
Lumber, 2x4 Pine, per M ft. bm	83.080	82.820	+0.3	89.490	− 7.2
Common brick, per M	27.438	27.338	+0.4	24.412	+12.4
Ready-mixed concrete, per c. y.	10.259	10.207	+0.5	9.561	+ 7.3
Structural Clay Tile, 3x12x12 per M	131.670	128.400	+2.5	121.090	+ 8.7
WAGE RATES (20-cities' average)					
Common	1.417	1.413	+0.3	1.272	+11.4
Skilled (aver. 3 trades)	2.353	2.347	+0.3	2.140	+10.0
Bricklayers	2.560	2.554	+0.2	2.303	+11.2
Structural Ironworkers	2.339	2.332	+0.3	2.146	+ 9.0
Carpenters	2.183	2.177	+0.3	1.970	+10.8

	December		%	Twelve Months		%
CONTRACTS AWARDED (thous.)	1948	1947	Change	1948	1947	Change
Total U. S. (ENR reported)	$843,544	$503,381	+34.1	$7,219,387	$5,659,232	+25.2
Private	505,899	272,367	+48.6	3,581,444	3,167,801	+10.9
Public	337,645	231,017	+16.9	3,637,943	2,491,431	+43.3
Federal	71,744	86,670	−33.8	951,229	656,419	+42.2
ENR Const. Volume Index, '13 = 100	304	246	+23.6	254	228	+11.4
NEW CONSTRUCTION CAPITAL						
Total	$841,196	$781,493	−13.9	$6,786,211	$3,885,786	+71.3
State & Mun. Bond Sales	195,174	102,822	+51.9	2,033,502	1,177,918	+69.4
Corporate Security Sales	646,022	678,671	−23.8	2,701,488	1,641,428	+61.5
Federal (non-federal work)	....	....	....	492,289	247,711	+98.7
Federal (federal work)	....	....	....	1,558,932	818,729	+90.4

MATERIAL SHIPMENTS & LABOR SUPPLY	November(N) October(O) 1948	1947	% Change	Eleven Months(11) Ten Months(10) 1948	1947	% Change
Cement, thous. bbls., Bu. of Mines	20,321(O)	20,562(O)	− 1.2	173,477(10)	158,749(10)	+ 9.3
Fabr. Struct. Steel, Thous. tons, AISC	165(N)	175(N)	− 5.8	1,805(11)	1,742(11)	+ 3.6
Lumber, mil. ft. bm., NLMA	3,085(O)	2,946(O)	+ 4.7	30,297(10)	30,008(10)	+ 1.0
Lumber Prod., mil. ft. bm., NLMA	3,369(O)	2,936(O)	+14.7	31,367(10)	30,955(10)	+ 1.3
Contract Const. Employ., thous., BLS	2,150(N)	2,046(N)	+ 5.1	2,205(11)	1,916(11)	+15.1

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in Stock for Shipment Right Now!

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These large, diversified stocks mean you can get fabric that exactly meets your job requirements. And Ryerson service also includes engineering help. We gladly recommend the correct size and gauge to give necessary strength at lowest cost.

So for floors or roofs, highway ground slabs or concrete pipe, for loads of a few pounds or many tons—call Ryerson for wire fabric.

Your nearby Ryerson plant is also a convenient source for many other construction steels. While it's true that we are still short of some kinds and sizes, our stocks turn quickly. A size out today may be in tomorrow. You can often save time and trouble by concentrating purchases of several products with us. Get in touch with our nearest plant next time you need steel.

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RYERSON STEEL

THE CONSTRUCTION WEEK

WHAT WILL CONGRESS DO?—With all due respect to the fallacies of prophecy, our Washington experts have come up with these predictions on what Congress may be expected to do on matters affecting construction:

Foreign—ECA will quickly be given the extra $1.5 billion needed to finish out fiscal '49, and an extra $4 billion for fiscal '50.

Rearmament—There will be no major step-up in preparedness, but the modest program started last spring, the 70-group Air Force and the draft will be continued.

Labor—Minimum wage will go up from the present 40 cents, either to 75 cents right away or 65 cents now and 75 cents in a year or two.

Housing—Federal subsidy for low-rent public housing is a sure bet, under a revived Taft-Ellender-Wagner bill. Additional secondary mortgage money is sure if home building slacks off.

Taxes—No excess profits tax, but higher corporate income levy is certain; probably no change in personal income rates.

Materials—Commerce department's voluntary allocation program will be extended, and government will get at least standby authority to step in where industry doesn't do the job.

Basing points—Congress will huff and puff over this issue, but won't vote any clear definition of what kinds of delivered prices are legal.

Overtime-on-overtime—Supreme Court's recent decision will be nullified by legislation legalizing all time-and-a-half as legitimate overtime.

Resources—TVA's steam plant will go through in a breeze; there'll be no Missouri Valley authority, but Bonneville might be formalized into a northwest TVA; St. Lawrence has a better chance this year—but it isn't good enough.

Science Foundation—Probable, this time.

Business—Bills that would permit government construction of synthetic oil and steel ingot plants if industry doesn't pick up preferred RFC financing, will get at least an "educational" airing.

ARMY APPROVES BAY CROSSINGS—Acting Secretary of the Army William H. Draper Jr. and Lt. Gen. R. A. Wheeler, chief of the Corps of Engineers, have announced their approval of plans for both proposed crossings of San Francisco Bay. Although an Army-Navy joint board favored the southern causeway-tube connection, and the California Department of Public Works Division of San Francisco Bay Toll Crossings favors a bridge parallel to the existing structure (ENR Nov. 25, p. 39), the approval is carefully non-partisan, saying only that neither crossing will be a menace to navigation.

MONEY FOR WORLD WORK—In the next two or three months, the World Bank is expected to announce loans of about $150 million, all in the field of economic development in countries in Europe, South America and the Far East. Among the amounts will be: $75,000,000 to the Brazilian Traction, Light & Power Co.; about $40,000,000 to Mexico for power development; $50,000,000 for hydroelectric projects in the Philippine Republic and $50,000,000 for industrial expansion by private companies in Belgium.

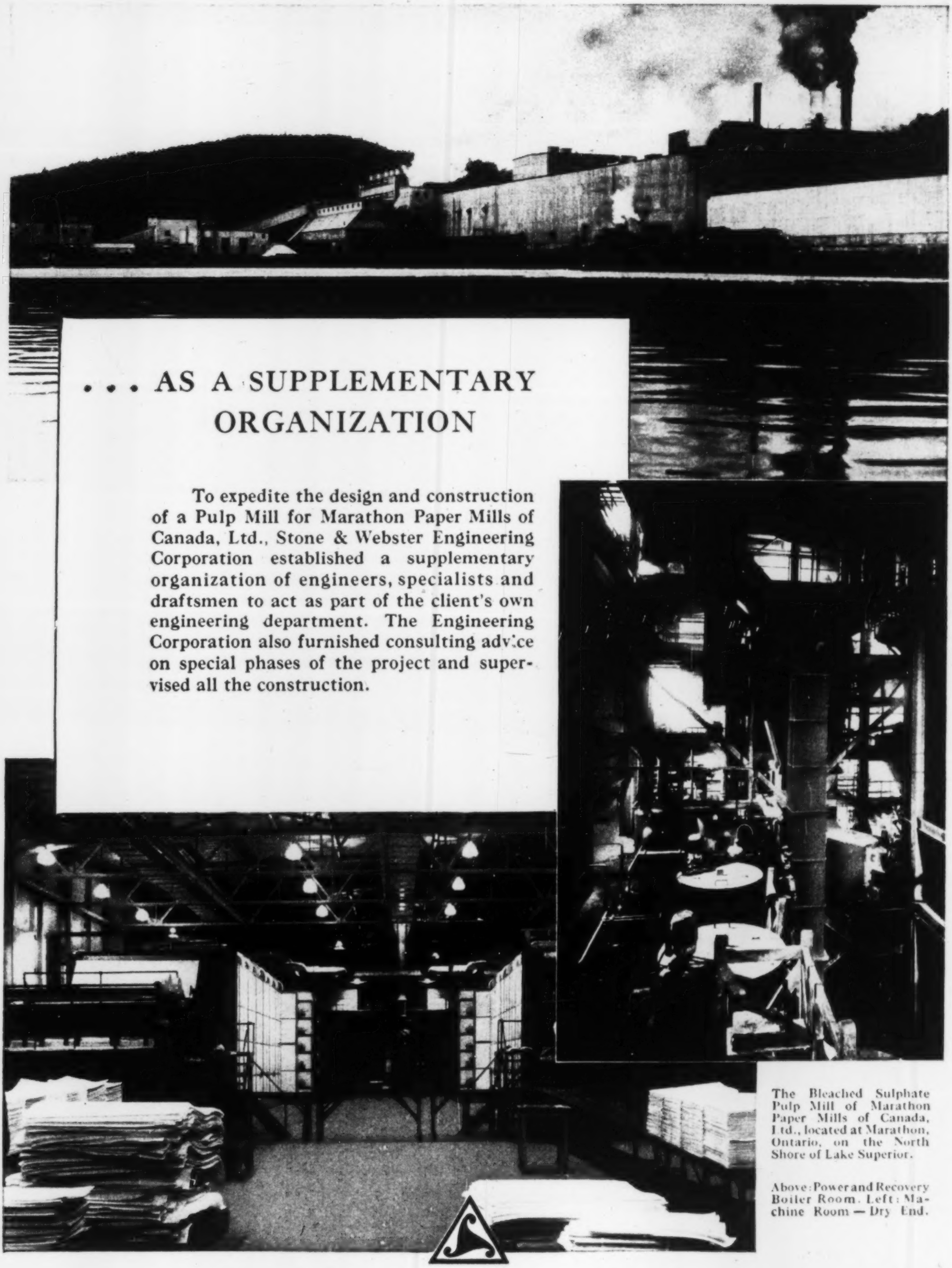
ORGANIC FERTILIZER—New support for the idea of using sewage sludge and garbage for fertilizer comes now from the medical profession which believes that artificial fertilizers do not impart enough of the minerals that promote body growth and combat so-called deficiency diseases, such as arthritis. Johns Hopkins University sanitary engineers are seeking to evaluate the kind and amount of minerals in sewage sludge. The success of their endeavor would make the processing and sale of such sludge by municipalities more attractive than it is now.

MORE BRIDGES—NEWS-RECORD figures for 1948 will show the dollar volume of bridge contracts let to be 52 percent ahead of the previous year. One reason for this was cited last week by N. R. Patterson, new president of the American Institute of Steel Construction: now under construction are 1,904 steel highway bridges, 164 steel railroad bridges, largest total in over a decade.

ENGINEERS FOR AFRICA—ECA has promised the British to recruit some American technical help for the program of strategic materials development in Africa. First requirement is for about 25 geologists and 25 surveyors and topographers to scout for mineral deposits and map new railways. Subsequently, American engineers may also be required for actual construction. Areas involved are Nigeria and the Gold Coast, Tanganyika and Kenya and possibly Northern Rhodesia. From ECA in Washington, men would first go to ECA, London, for indoctrination, and then to the British Colonial Office in Africa for which they will work.

... AS A SUPPLEMENTARY ORGANIZATION

To expedite the design and construction of a Pulp Mill for Marathon Paper Mills of Canada, Ltd., Stone & Webster Engineering Corporation established a supplementary organization of engineers, specialists and draftsmen to act as part of the client's own engineering department. The Engineering Corporation also furnished consulting advice on special phases of the project and supervised all the construction.



The Bleached Sulphate Pulp Mill of Marathon Paper Mills of Canada, Ltd., located at Marathon, Ontario, on the North Shore of Lake Superior.

Above: Power and Recovery Boiler Room. Left: Machine Room — Dry End.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

EDITORIALS

Happy New Year

WRITING FROM ATHENS about Christmas in Greece, Anne O'Hare McCormick of the New *York Times* symbolized it partly as "waifs of an endless war entranced by packets of clothing and toys distributed at a party given for them by the engineering corps attached to the American mission." Far from the happy and luxurious Christmas being celebrated in their homeland, these American engineers still exercised an urge toward goodwill that is universally needed as the new year of 1949 begins. For Americans generally, and the construction industry in particular, it promises to be a happy year in so far as happiness can be measured by work and creature comforts. Last week in our year-end estimate we set down $18 billions as the probable total of contracts, a record-breaking sum. Yet all this activity will be less than satisfying without a mental state that seeks more avidly than ever before a greater measure of Peace on Earth, Goodwill Toward Men. In a world wracked by little wars abroad, selfish disputes at home, and by frightening dreams of an all-inclusive war that no one wants, the desire to give this Christmas message meaning was never greater nor more universal. That in itself is a good omen. But it will only pay off on the big issues if the urge toward peace and goodwill is exercised in the smaller, everyday acts of individuals—in labor-management disputes for example. A broad application of the goodwill and charity so strikingly displayed by our G.I. engineers in Athens will go far toward making a prosperous 1949 a happy one as well. A Happy New Year!

Prestressed Concrete Pavements

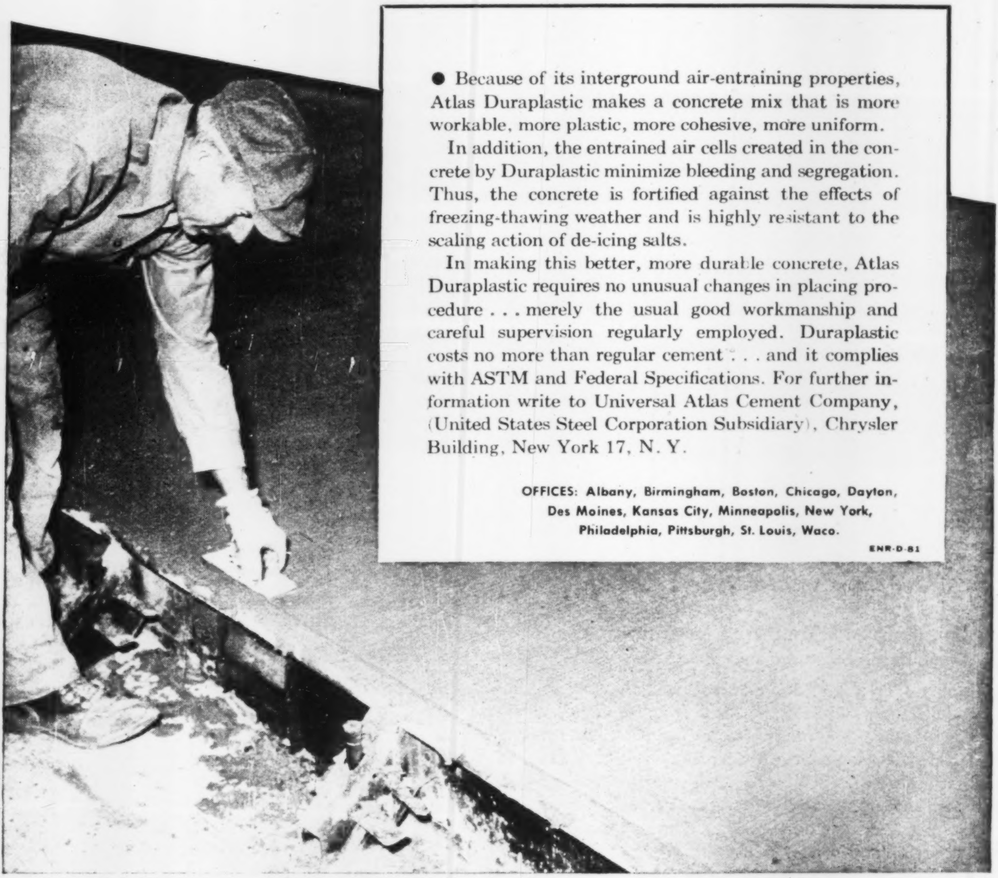
THE PRESTRESSED concrete warehouse floor described on p. 68 was built as an experiment, looking forward to the application of prestressing to the construction and repair of concrete pavements for highways and airports. From its construction those interested in determining the possibilities of this new method in highway and airport work have gained practical experience with devices for developing and maintaining stress in the wires and strands used to put the concrete in compression. And possibly something was learned about costs; but conditions were so unlike those that must be met in building a highway or airport pavement with standard paving equipment that the cost data are far from conclusive. As a design precedent too this particular warehouse floor unfortunately has shortcomings, primarily because the 3-in. prestressed slab is laid over an unreinforced concrete slab made so thick (9 in.) that it will not crack under the loading to which it is subjected. This loading appears to be no more severe than normal highway loadings, which could be carried without distress by the 9-in. unreinforced slab. And the warehouse floor gives no information on such questions as the practical length of prestressed highway pavement slabs on tangents of uniform slope, what limits there will be on slab lengths on horizontal and vertical curves, and what type of joints must be used to insure the freedom of movement that is essential to a prestressed slab design. Answers to such questions must of course await the construction of a highway or a test track built under field conditions. In the meantime, the designers and builders of the warehouse floor have performed a valuable service in directing the thinking of American engineers toward the possibilities and problems of prestressed concrete pavements.

Post Card Traffic Survey

TRAFFIC SURVEYS conducted by mailing post card questionnaires are not new, but they have seldom been very successful either. Apparently, however, with proper groundwork and a well-planned advance publicity campaign, they can be executed economically and accurately even in cities of substantial population. Witness, the Canton (Ohio) post card survey, described in this issue, in which a return of over 50 percent was received from one day's total mailing of over 27,000 truck and passenger car questionnaires. Supplemented by an interview survey conducted at the city limits on all routes carrying over 500 vehicles per day, plus a 24-hr. screen line check count, the complete survey cost less than $10,000. It revealed many traffic patterns. And it not only showed the origin-destination habits of intracity traffic, but also the fact that a large volume of the traffic routed through the congested business district did not even want to enter the city. Such data have a twofold usefulness. They can be used by the city engineer concerned with redesign of street layouts. And they can furnish guidance to traffic operating officers seeking to route vehicles in the most efficient manner over existing street layouts. Moreover, the cost of a post card traffic survey is so modest that frequent repeats are possible, thus providing a continuous and up-to-date picture of traffic conditions. Other cities having street and highway patterns of a type that permit a few actual traffic counts to verify the accuracy of a post card survey may find much of profit in Canton's experience, but only if public cooperation is secured by a vigorous publicity campaign to convince the average motorist that the survey is "his" survey.

ENGINEERING NEWS-RECORD is a consolidation of Engineering News and Engineering Record, effected in 1917. The Contractor was consolidated with Engineering News Record in 1918. Engineering News was founded in 1874 as The Engineer and Surveyor, which title subsequently became The Engineer, Architect and Surveyor, Engineering News and American Railway Journal and finally Engineering News. Engineering Record was established in 1877 as the Plumber and Sanitary Engineer. Subsequently it became The Sanitary Engineer, Engineering and Building Record, and, finally, Engineering Record. All rights to the above titles are reserved.

DURAPLASTIC makes better concrete...without change in usual procedure



● Because of its interground air-entraining properties, Atlas Duraplastic makes a concrete mix that is more workable, more plastic, more cohesive, more uniform.

In addition, the entrained air cells created in the concrete by Duraplastic minimize bleeding and segregation. Thus, the concrete is fortified against the effects of freezing-thawing weather and is highly resistant to the scaling action of de-icing salts.

In making this better, more durable concrete, Atlas Duraplastic requires no unusual changes in placing procedure . . . merely the usual good workmanship and careful supervision regularly employed. Duraplastic costs no more than regular cement . . . and it complies with ASTM and Federal Specifications. For further information write to Universal Atlas Cement Company, (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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ENR-D-81

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ENGINEERING NEWS-RECORD

JANUARY 6, 1949 VOL. 142 NO. 1

Federal-aid airport program hits stride after slow start

CAA reports all funds appropriated are expended or earmarked, after two years of long-range program — Rules changes speed work for local governments

After a rules-impeded start in its first year, the $1.7 billion federal-aid airport program has finally hit its stride, a survey of commitments by the Civil Aeronautics Administration showed last week.

Ending the first two and one-half years of the proposed seven-year effort to spur the construction of airports and airport facilities, CAA reported that it has earmarked all the funds so far appropriated—$117.5 million.

Of this total, more than $63,500,000 has been obligated by signed contract (called grant offers) with local governmental units that have 538 airports under construction or completed.

The program was slow in starting, while both CAA personnel and local sponsor-applicants were learning new procedures. But modifications within the past year—including streamlining the paper work by eliminating eight forms and consolidating the project application and the sponsor's assurance agreement into one—made possible the speed-up in the program.

Another modification of initial cumbersome procedure was decentralization of the CAA organization into nine regional and a number of district offices—usually one to each state. Project requests and applications for grant offers are now processed in the field offices, with only final review and approval needed from Washington. It now takes about three weeks to process a project application through district, regional and Washington offices, and return the grant offer to the applicant.

The Seattle-Tacoma airport, which last year went through the full gamut from tentative allocation to accepted grant offer in 60 days.

Reviews accomplishment

Totaling up its figures for the two and one-half year period, CAA noted that Congressional appropriations for the program have been well below the $100 million yearly top figure set up in the original act. Actual appropriations for three fiscal years, starting with 1947, have been: $45,000,000, $32,500,000 and $40,000,000.

On July 1, 1948—the first day of fiscal 1949—CAA had earmarked nearly all of its $40,000,000 appropriation for the 1948 fiscal year, and had on hand $210 million project requests awaiting later action. The same condition exists today.

To the $63,500,000 total obligated by signed contracts this year can be added another $36,000,000 tentatively allocated to proposed airports for which project requests have been approved. Another new regulation—in effect since June—requires prompt positive action by local sponsors in starting these projects within 90 days, lest the allocations be withdrawn and the funds ticketed for other airports.

CAA's statement that contract allocations have jumped considerably in the last year is borne out by Engineering News-Record reports, which show that $69,409,000 worth of contracts for airport work were let by local governments in 11 months of 1948, as compared to $47,762,000 for 1947.

Federal participation

To the airports and airport improvements so far started, the federal government contributes about 50 percent of the cost—about $127 million.

To control and coordinate the program, the CAA administrator prepares and revises annually a national airport plan, listing the public ports that CAA considers desirable for construction and improvement. New projects must first pass the test of this plan—if they are not on the list, they have small chance of being accepted for tentative allocations. Following this tentative allocation, the project gets a grant offer after assurance is given that local funds and authority are available to complete the work. Signing of the grant offer seals the contract with CAA for federal participation in the cost.

NEW TYPE DRESS

With this issue, ENGINEERING NEWS-RECORD appears in a new type-dress.

The new type face is Electra, and represents the third change in the typography of the journal within the past 15 years. In that period—as typographers produced successively more legible type faces—ENGINEERING NEWS-RECORD has been printed in Century, Bodoni, and now Electra.

The change in "dress" is a part of a continuing effort to improve service to the readers.

CAA urges cross-wind landing gear

More economical design of airports will result from general adoption of cross-wind landing gear on airplanes. Civil Aeronautics Administrator Delos W. Rentzel pointed out that fact last week in announcing the appointment of John H. Geisse to head a vigorous CAA program to promote use of the cross-wind gear.

CAA already is encouraging communities to work out their master plans for airports on the basis of cross-wind landings, Mr. Rentzel said. These plans are helping to hasten widespread adoption of the gear.

Small, one-strip airfields can be spotted in metropolitan areas close to large numbers of potential users, he explained, citing Chicago's new lakefront airport as an example. Large airports can be laid out to permit simultaneous use of all runways by planes equipped with the cross-wind device, thus increasing the plane-handling capacity of the fields to a very large extent.

These possibilities open the way to considerable savings in runway construction. To help take advantage of the potential economies, Mr. Geisse will work through the CAA office of airports with communities that plan to build or improve their airfields.

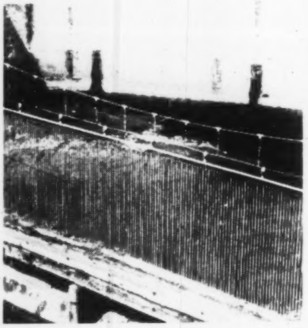
NEWS BRIEFS

Industrial Construction – Six major oil-refining companies have earmarked $163 million for expenditure in the Philadelphia area during the coming year. The Texas Company, Gulf Refining Company, Sun Oil Company, Atlantic Refining Company, Socony Vacuum Oil Company, and Sinclair Company will construct refinery facilities, warehouses, pipe lines and necessary buildings. . . . Building at Port Edwards, B. C., will commence early in 1949 on the Columbia, Cellulose Company's $30,000,000 expansion project. . . . H. J. Heinz Co. will launch a $15,000,000 building program at its Pittsburgh, Pa., plant in 1949. Four new buildings will be erected and improvements will be made on existing structures. . . . The Philadelphia Electric Co. has a $322 million expansion program for the next five years.

Water and Sewage – Legal obstacles have been cleared for a 15-county Maumee River conservancy in Ohio. While flood control is the prime purpose, plans also include improved disposal of liquid waste. . . . A federal grant of $2,000,000 is sought by Hamilton, Ohio, to help finance a sewage disposal plant worth twice that amount. . . . New York State Public Works Department approval has been given a $1,200,000 sewer system and sewage disposal plant for Endwell, N. Y. . . . Voters of Jefferson County, Ala., will vote January 25 on an $18,000,000 bond issue to finance a sewer program.

Housing – Hoosier Airport, an 82-acre tract on the west side of Indianapolis, Ind., has been sold as a site for a $4,000,000 development of 400 new homes and a shopping center, to be built by Kessler Homes, Inc. . . . Wilmington, Del., has approved construction of a 12-story apartment house to cost $1,000,000. Allen Hart of Philadelphia and John K. Walters of Wilmington are the builders. . . . John A. Johnson Contracting Corp. will build a $5,000,000 low-rent housing project in Atlanta, Ga., to provide 720 family units and a community shopping center. . . . A $22,500,000 housing project in San Francisco has been started to provide homes for 2,800 persons. Stoneson Bros., builders, plan a 760-unit development on a 56-acre site to include four 10-story apartment houses, 28 three-story buildings, and four, two-story buildings. . . . Low bidder on the construction contract for Bronx River Houses in New York City was H. R. H. Construction Corp., with an $8,161,000 proposal on the 1,246-unit job.

Highways – A $20,000,000 emergency appropriation for building farm to market roads will be urged in the Texas legislature next month. . . . Two billion dollars worth of highway work must be done in New York State before facilities are adequate for the present traffic demands. The desirable current rate of expenditure is $143 million per year, a rate that the state will strive to achieve in 1949. . . . Treat Engineering Co., of Oklahoma City, has completed design of a by-pass of that city by U. S. 66. PRA approval is now sought for the $3,000,000 project. . . . U. S. Highway 63 is expected to be paved through the Ozark Mountains from Hoxie, Ark., to Thayer, Mo., at a cost of $5,000,000. . . . U. S. Highway 83, which parallels the Rio Grande for 31 miles between Laredo and Brownsville, Tex., will be relocated because of the construction of Falcon dam in Zapata County. The relocation east of its present location will cost the federal government $3,000,000. . . . California's highway budget for the 1949-50 fiscal year will be $87,000,000. . . . Several state legislatures will soon receive recommendations for increased gasoline taxes. Among those reporting to Engineering News-Record in the past week are Pennsylvania, Minnesota, Illinois and South Dakota.



FISH TICKLER–Barring the way into the intake of the power canal of the Pacific Power & Light Co.'s hydro-electric plant on Hood River, Ore., is this new electronic fish screen. The electrodes suspended over a buried ground wire across the 80-ft. intake give off impulses which divert downstream migrant fish into the true channel of the river, keeping them out of the forebay of the plant.

Titanium discussed as possible structural metal

Titanium and its possibilities as a structural material were discussed by over 250 representatives of government agencies at a recent symposium in Washington, D. C. The discussion was sponsored by the Office of Naval Research and was attended by military, industrial and academic researchers.

In his contribution to the discussion, Capt. W. H. Leahy, ONR assistant chief for research, said of titanium that "its high strength-weight ratio, its corrosion resistant properties, and its high temperature characteristics are all very attractive. Its natural abundance in the U. S. is also a reason for giving it careful consideration."

Papers presented at the symposium offered conflicting data on fatigue strength of the metal. ONR authorities, however, were inclined to accept tests showing an endurance limit near 70 percent of its tensile strength—steel approaches 50 percent.

Tests have shown that the modulus of elasticity is not greatly affected by temperatures up to 1,000° F and remains at about 15,000,000 psi. up to that point. Its high melting point presents a production problem since crucible metals react with the titanium; nitrogen and oxygen in the air also contaminate the metal at its melting temperature.

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Welding Foundation offers new 1949 awards program

Trustees of the James F. Lincoln Arc Welding Foundation are sponsoring a new award program entitled "Welded Bridges of the Future" to advance progress of welded bridge design.

First award is $3,000, the second, $1,500, and the third award, $750. Ten honorable mention awards of $100 each will be given.

Competition opened January 1 and will close June 30, 1949.

The design problem is a two-lane deck highway bridge supported on two end piers 120 ft. apart. The bridge is to be designed for ASTM-A7-46 steel and for H20-44 loading. No restriction to available structural shapes is applied.

The Rules Committee and Jury of Award is under direction of Wilbur M. Wilson, research professor of structural engineering, University of Illinois. Complete rules are available upon application from the James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio.

San Francisco gets $193 million plan for freeway and subway construction

Report to planning commission by consultants proposes integrated plan of improvements that includes rapid transit and expressways

A transportation plan for San Francisco involving $193 million of freeway, expressway and subway construction was recently presented to the City Planning Commission by De Leuw Cather & Co., consulting engineers, and Ladislas Segoe and Associates, consulting city planners, both firms of Chicago. The report was a year in preparation, and it proposes a 21-year schedule involving $111 million for freeways and expressways and $82,000,000 for subways.

Plans involve six major freeways inside the city limits in addition to the Bayshore Freeway now under construction by the State Division of Highways. These are supplemented by expressways and other major thoroughfares that operate with synchronized traffic signals. The freeways recommended will tie into either or both of the proposed new San Francisco Bay crossings (ENR Nov. 25, p. 39), although a preference for the southern crossing is indicated.

The subway program is recommended to improve San Francisco's antequated street railway system. It includes a main rapid transit subway under Market St., principal thoroughfare of the city. Also involved is a separate 11-block long vehicular tunnel to bring express buses (either gasoline or trackless trolley) into the downtown area. The report recommends that the Mission Freeway be divided by rail lines that would feed into the Market Street subway. These rail facilities are to be supplemented by express bus service operating on the freeways.

No finance plan offered

Also involved in the report are specific recommendations relative to traffic control on regular city streets, parking facilities, and terminals for other Bay area transportation facilities. Basically an engineering study of San Francisco's transportation problems, the report, while it includes cost estimates, makes no recommendations for financing the suggested improvements.

The City Planning Commission, with the aid of other city departments and the consultants will study the report, making such revisions as may seem desirable. The resulting program will then be incorporated in an integrated plan of improvements required for San Francisco's development. It is hoped to develop uniform support for the plan so construction of such items as a convention hall and additional airport facilities can go ahead along with the transportation facilities, with design and financing of all facilities well-coordinated.

Major stumbling block in the way of accomplishing the proposed plan seems to be financing. The construction of freeways currently underway uses gas-tax and other available funds. However, the present annual rate of expenditure falls below the $5,300,000 required by the DeLeuw plan.

The only apparent source of revenue for the rapid-transit improvements is through general obligation bonds voted by the people.

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Frank Lloyd Wright wins highest award of AIA

The Gold Medal of the American Institute of Architects, highest honor of the organization, will be presented to Frank Lloyd Wright at the 81st annual convention of the institute in Houston, Tex., on March 17.

According to an announcement by Douglas W. Orr, president of the AIA, Mr. Wright will receive the award in recognition of his distinguished contribution to the profession of architecture. He won international fame as architect of the Imperial Hotel in Tokyo, which he designed successfully to withstand earthquakes. In preparation for that work, he studied civil engineering at the University of Wisconsin from 1884 to 1888.

ALAN G. STANFORD is the newly elected president of the National Society of Professional Engineers, succeeding Alex Van Praag, Jr. Mr. Stanford is vice-president of Robert & Co., Inc., Atlanta, Ga.

MAJOR MEETINGS

Materials Handling Exposition, Convention Hall, Philadelphia, Pa., Jan. 10-14.

American Society of Photogrammetry, annual meeting, Shoreham Hotel, Washington, D. C., Jan. 12-14.

Associated Equipment Distributors, annual meeting, Stevens Hotel, Chicago, Ill., Jan. 16-20.

American Society of Civil Engineers, annual meeting, Hotel Commodore, New York, N. Y., Jan. 19-21.

Canadian Construction Association, Royal York Hotel, Toronto, Ont., Jan. 23-26.

Concrete Industries Exposition, Cleveland Public Auditorium, Cleveland, Ohio, Jan. 31-Feb. 3.

American Road Builders Association, annual meeting, Willard, Mayflower and Statler Hotels, Washington, D. C., Feb. 7-9.

National Crushed Stone Association, Hotel New Yorker, Feb. 7-9.

National Ready Mixed Concrete Association, 19th annual convention, Hotel New Yorker, New York, N. Y., week of Feb. 14.

National Sand and Gravel Association, 33d annual convention, Hotel New Yorker, New York, N. Y., week of Feb. 14.

National Association of Home Builders, annual convention and exposition, Stevens Hotel, Chicago, Ill., Feb. 20-24.

National Council for Stream Improvement, Waldorf-Astoria, New York, N. Y., Feb. 21-23.

American Concrete Institute, 45th annual convention, Hotel Pennsylvania, New York, N. Y., Feb. 22-25.

Associated General Contractors of America, 30th annual national convention, Waldorf-Astoria Hotel, New York, N. Y., Feb. 27-March 3.

Association of Highway Officials of the North Atlantic States, 25th annual convention, Hotel Statler, Boston, Mass., March 1-3.

American Concrete Pipe Association, 41st annual convention, Richmond, Va., March 3-6.

American Institute of Architects, annual meeting, Rice Hotel, Houston, Tex., March 15-18. American Railway Engineering Assn., Palmer House, Chicago, Ill., March 15-17.

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Edward Kemper resigns as AIA executive director

Edward C. Kemper resigned Dec. 31 after 35 years as executive director of the American Institute of Architects.

He will be succeeded by the organization's present director of public and professional relations, Edmund R. Purves. AIA President Douglas W. Orr announced the changes.

Canadian board reports on St. Lawrence

Development of an additional 1,200,000 hp. of St. Lawrence power for the province of Quebec is envisaged in a report of an engineer board appointed by the government of Canada to examine St. Lawrence seaway plans with special attention given to the Lachine Rapids.

The Lachine Rapids are located immediately upstream of the harbor of Montreal; their existence actually led to the founding of the city when the first settlers had their boats stopped by the rough waters.

At present the rapids are passable only through a small canal with a 14 ft. draft, which connects the open river at Montreal with Lake Ontario.

Favor power-navigation plan

The board, under the chairmanship of R. A. C. Henry, favors the general features of the 1926 design prepared for combined power and navigation, which would utilize the available head in the great rapids.

Two proposals were submitted by the board: Plans for joint development of power and navigation costing about $250 million and a plan for power development alone costing $213 million. If international agreement is reached with regard to the seaway project, Canada is committed to carrying out either the combined power-navigation project at the rapids or a new navigation canal alone, the cost of which is now estimated to be $87,000,000.

If, on the other hand, international agreement is not reached, the power project could be carried out alone, presumably by the province of Quebec, without change to the present canal system; or else the combined navigation and power scheme could be carried out as an entirely Canadian effort.

This report involves no formal commitment of any kind by the province of Quebec. Transport Minister Chevrier, in making the report public, indicated that the government would not make any hasty decision on the basis of the report now presented. One of many interesting engineering features is a proposal that a new four track tunnel be built between the island of Montreal and the mainland to the south. This tunnel would carry the Canadian National Railways and would cost an estimated $19,000,000. This would leave the famous Victoria Bridge available for vehicular traffic only.

Columbia River hearings are scheduled

Four public hearings on the Corps of Engineers Report 308 on the Columbia River and tributaries (ENR Nov. 18, p. 7) are scheduled for late January and early February by the Board of Engineers for Rivers and Harbors.

The board is the reviewing authority for all Corps of Engineers development plans and survey reports. It will consider the proposed $3-billion Columbia River development plan in four Columbia basin cities: Jan. 31—Spokane; Feb. 1—Seattle; Feb. 2—Portland; and Feb. 4—Pocatello. This last hearing was originally scheduled in Boise but was changed because of a conflict with sessions of the state legislature.

Power installation schedule

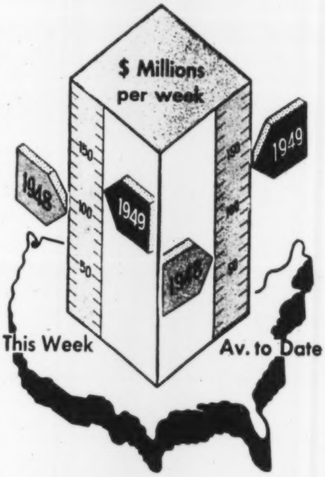
Since the announcement of the plan, the Bonneville Power Administration has issued an "Advance Program of Transmission System Development." This agency distributes the power generated by federal projects in the Columbia basin area. The program includes a schedule of generator installations at projects authorized but not under construction, as well as projects proposed in the Corps of Engineers plan. First deliveries of power are scheduled for the Lower Snake River plants and the Albeni Falls project in 1954, for the Chief Joseph project in 1955, and for Hells Canyon project in 1956. No other major projects not now authorized are scheduled.

In presenting this schedule, the BPA report says it has been "formulated jointly by the Bureau of Reclamation, the Corps of Engineers, and the Bonneville Power Administration." However, a representative of ENGINEERING NEWS-RECORD was told by the Corps of Engineers in Portland that the corps report does not include a recommendation as to the priority of construction of the various projects. This is believed to be a primary purpose of the hearings by the board.

Location of the Hells Canyon project has been the subject of controversy between the Corps of Engineers and the USBR. A recent statement by Col. T. D. Weaver, North Pacific division engineer, and R. J. Newell, USBR regional director, said that the two agencies are now in agreement.

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Jan. '49	477.41	229.49
Building Cost	Jan. '49	354.91	191.85
Volume	Dec. '48	304	133



Activity This Week

As reported to ENR

Amount of contracts let

(Millions of dollars, continental U. S. only)

	Jan. 6 1949	Jan. 8 1948	% Chge
Federal	$34.2	$12.1	+183
State & Mun	44.6	38.7	+15
Total Public	78.8	50.8	+55
Total Private	45.6	34.8	+31
U. S. Total	**$124.4**	**$85.6**	**+45**

Contracts by type of work

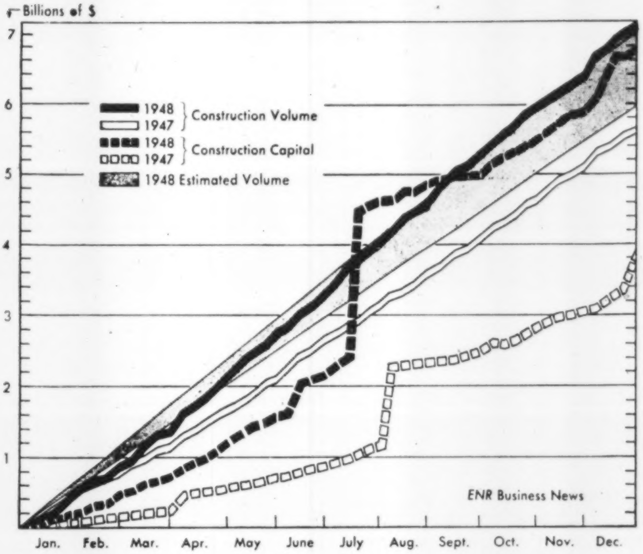
	This Week	Jan. 8 1948	% Chge
Waterworks	$3.0	$2.0	+50
Sewerage	5.0	2.1	+138
Bridges	10.9	4.0	+173
Highways	5.5	16.0	−66
Earthwork, Waterways	31.7	3.4	+832
Buildings, Public	18.7	16.2	+15
Industrial	4.5	7.0	−36
Commercial	39.9	23.1	+73
Unclassified	5.2	11.8	−56

NOTE: Minimum size projects included are: Waterworks and waterway projects, $28,000; other public works, $50,000; industrial buildings, $68,000; other buildings, $250,000.

New capital for construction

	Cumulative		
	1948 (1 wk.)	1947 (1 wk.)	% Chge
NON-FEDERAL	N. A.	$16.0	....
Corporate Securities	N. A.	2.0	....
State and Municipal	N. A.	14.0	....
U. N. Building Loan	N. A.	....	....
Federal Aid Highway	N. A.	....	....
FEDERAL	N. A.	....	....
Total Capital	**N. A.**	**$16.0**	....

N. A. stands for not available.



Engineering construction volume tops all previous December records

December construction contracts were awarded at the highest peacetime rate and the highest rate for any December on record, according to ENGINEERING NEWS-RECORD.

The largest contribution to this record is the $200 million Texas to New York gas pipeline. Other large individual contracts awarded during the month were: the $24,000,000 United Nations secretariat building and garage in New York City; a $20,000,000 36-story Park Avenue office building in New York; a $16,000,000 electrolytic copper refinery in Garfield, Utah; the $15,600,000 Neversink Tunnel and Control Works for the New York Board of Water Supply; and a $13,000,000 power plant for the Wisconsin Electric Power Co. in Port Washington, Wisconsin.

The average week for December was $168.7 million, up four percent over the previous peacetime peak of $162.1 million in October, 1948, and up 50 percent over the preceding month's rate of $112.8 million.

All nine classes of construction participated in the gain, with unclassified construction showing the greatest increase over last month—399 percent as the result of the Texas to New York gas pipeline. Total dollar volume of unclassified contracts awarded in the five-week month of December amounted to $237.8 million.

The other classes gained over November as follows: sewerage, 101 percent; industrial buildings, 37 percent; waterworks, 32 percent; bridges, 27 percent; commercial buildings, 22 percent; public buildings, 3 percent; and highways and earthwork projects, 0.2 percent.

In a geographic breakdown, the Middle Atlantic states and those West of the Mississippi recorded the largest totals for the month—$298 and $261 million, respectively. On a weekly average basis, this was a gain of 108 and 75 percent over the previous month. The Far West gained 97 percent. Losses were recorded for the Middle West of 27 percent; New England, 12 percent; and the South, eight percent.

New construction capital raised by private organizations and states and municipalities totaled $841 million in December, a five-week month. This was at a weekly rate of $168 million, highest since December 1947 when new bond and security sales averaged $195 million.

Corporate securities totalled $646 million, with public utilities getting over $500 million or 82 percent of the total. Included, are the $180 million borrowed by the Transcontinental Gas Pipe Line Corp. for the Texas to New York pipeline and the $150 million financed by the American Telephone and Telegraph Co.

States and municipalities obtained $195 million for construction in December. About $125 million or 64 percent of this total, approximately the same ratio as in November, will go for public buildings. The New York City Housing Authority borrowed the largest single sum, $57,000,000 for housing projects.

ENGINEERING CONSTRUCTION CONTRACTS REPORTED TO ENGINEERING NEWS-RECORD—DECEMBER, 1948

Engineering News-Record *reports continental U. S. Construction projects of the following minimum costs*—*Waterworks, excavation, drainage and irrigation*, $28,000; *other public works* $50,000; *industrial buildings*, $68,000; *other buildings*, $250,000
Five Weeks—Thousands of Dollars (000 Omitted)

	December, 1948							U. S. Cumulative—Twleve Months		%	
Public Works	New England	Middle Atlantic	South	Mid West	West of Mississippi	Far West	Total U. S.	1948	1947	Change '47 to '48	Canada Dec. '48
Waterworks	1,960	15,823	2,067	1,189	2,780	685	24,504	208,658	139,141	+ 47	352
Sewerage	154	3,353	2,802	2,536	3,477	11,821	24,143	227,762	174,764	+ 28	861
Bridges, Public	1,361	14,485	7,473	1,886	2,907	8,120	36,232	293,512	195,223	+ 48	315
Earthwork and waterways	1,037	8,810	4,063	1,544	17,032	11,823	44,309	519,463	326,856	+ 56	1,147
Streets and Roads	3,665	10,749	18,273	9,078	22,358	4,503	68,626	995,819	794,133	+ 23	1,297
Buildings, public	4,572	32,824	19,086	16,793	29,001	17,054	119,330	1,161,262	615,492	+ 85	5,705
Unclassified, public	1,035	4,601	4,961	2,080	3,478	4,346	20,501	231,467	245,822	− 8	4,421
Total Public	**13,784**	**90,645**	**58,725**	**35,106**	**81,033**	**58,352**	**337,645**	**3,637,943**	**2,491,431**	+ 43	**14,098**
Federal government (included in in above classifications)	1,117	10,615	8,242	3,137	22,881	25,752	71,744	951,229	656,419	+ 42	
Private											
Bridges, private								9,143	1,074	+724	
Industrial buildings	4,071	17,400	6,580	18,575	23,834	22,825	93,285	1,095,581	862,205	+ 25	4,885
Commercial buildings	5,145	86,838	24,439	13,451	47,125	18,351	195,349	1,888,480	1,897,961	− 2	20,623
Unclassified, private	50	103,470	2,124	1,876	108,949	796	217,265	588,240	406,561	+ 42	575
Total Private	**9,266**	**207,708**	**33,143**	**33,902**	**179,908**	**41,972**	**505,899**	**3,581,444**	**3,167,801**	+ 11	**26,083**
Total Engineering Construction:											
Dec., 1948—5 weeks	**23,050**	**298,353**	**91,868**	**69,008**	**260,941**	**100,324**	**843,544**				**40,181**
Nov., 1948—4 weeks	21,028	114,868	79,697	75,806	119,066	40,647	451,112				50,940
Dec., 1947—4 weeks	13,844	181,578	99,460	49,453	112,363	46,686	503,384				16,367
Twelve months—1948	**322,898**	**1,990,853**	**1,080,686**	**859,549**	**1,873,750**	**1,091,651**		**7,219,387**		+ 25	**520,350**
Twelve months—1947	204,012	1,536,595	978,582	758,631	1,335,314	846,098			5,659,232		446,679
% Change '47 to '48	+55	+27	+8	+11	+38	+27					

Expansion plans totaling $1¼ billion started at 400 schools and colleges

Badly needed classroom, laboratory and dormitory buildings are now either under construction or in the final stages of planning

Reports of proposed or started educational buildings continue to pour in—bearing out ENGINEERING NEWS-RECORD predictions that public building will jump 30 percent above its '48 total in 1949 (ENR Dec. 30, p. 40).

A recent survey by the NEW YORK TIMES also shows that the record enrollment of college students is causing about 400 institutions in the United States to consider expansion plans that may call for an expenditure of $1.25 billion.

Typical reports concerning proposed new buildings recently received by ENGINEERING NEWS-RECORD include the following.

Colleges and universities

Construction has started on the first unit of a $5,000,000 group of engineering buildings at the University of California, Los Angeles. The contractor is R. J. Daum Construction Co. of that city. In the meantime, the university has presented a request for $19,875,000 in building funds to the California Public Works Board to pay for the construction of 20 projects on its campuses at Berkeley, Los Angeles, Davis, and Riverside. Plans include a $2,400,000 engineering building at Berkeley.

At the University of Houston, Tex., a $9,000,000 building program is to be put under way during the 1949 calendar year.

Virginia Polytechnic Institute has been advised to proceed with preliminary construction work on three new dormitory buildings. The General Assembly has appropriated $725,000 and the institute has been authorized to borrow an additional $480,000 for the buildings to house about 750 students.

It is estimated that building expansion requested by the University of Minnesota and the five state teachers colleges—including classrooms, laboratories, gymnasiums and libraries—would cost a total of $41,500,000.

Ordway Teal, chairman of the Board of Higher Education, New York City, reports that in the next ten years the city's four municipal colleges—City, Hunter, Brooklyn and Queens—will require $25,000,000 for development and expansion.

The six state colleges of Tennessee have called upon the State Board of Education to approve total appropriations of $4,012,000 a year for two years.

President Fred D. Fagg, Jr., of the University of Southern California, has announced that construction of the first two units of a $10,000,000 women's residence quadrangle will get under way early next spring. The first two units, consisting of a 4-story residence hall and an International House to house 200 students, will cost $1,240,000. Future plans call for additional units to house 1,500 students and to occupy an entire block. Architectural drawings are expected to be completed next month, and bids will be accepted thereafter.

Construction will begin soon on a $982,000 classroom and administration building at the University of Florida, Gainesville.

The contract for the construction of two dormitories at the Rhode Island State College, Kingston, has been awarded to Edmund J. Rappoli of Boston, Mass., at $950,800.

The McGill University building committee, Montreal, Que., has asked Architect A. J. C. Paine to complete drawings for a swimming pool and gymnasium extension to cost about $700,000.

The board of trustees of the University of Miami, Fla., has decided to complete a building started in 1926 but never finished because of hurricanes and financial reverses. For all these years the skeleton of the building has been standing, and now $800,000 is to be raised to finish the structure. Architect Robert M. Little has designed a new building which will utilize the foundation and the framework erected 22 years ago.

Contracts totaling $1,240,601 have been let for the construction of a four-story engineering laboratories building at North Carolina State College, Raleigh, N. C. The J. A. Jones Construction Company of Charlotte has the general contract for $942,400.

Trustees of the University of Tennessee have approved a $12,000,000 program for construction of new buildings. Appropriations are expected from the state legislature.

Illinois will sell, on behalf of the University of Illinois, bonds in the amount of $800,000 to aid in the construction of new twin residence halls for women, now being completed on the campus at a cost of $3,400,000. The Illinois general assembly has provided the remaining $2,600,000 of the amount.

University of Oklahoma will expand its memorial stadium, Norman, Okla., to accommodate 55,000 persons, at an expenditure of $1,000,000.

Construction plans totaling $10,260,805 for buildings and expansion have been approved by the Board of Regents of the University and state colleges of Arizona. Subject to approval by the state legislature, the expansion program includes $5,013,205 for the University of Arizona at Tuscon; $3,320,600 for Arizona State College, Tempe, and $1,927,000 for Arizona State College, Flagstaff.

Schools

Information supplied by the Federal Works Agency indicates that California's total of school construction begun during the first eight months of 1948 totalled $39,000,000. In the fiscal year 1949-50 the volume of school construction is expected to run close to $130,000,000.

In Indiana minimum requirements total $150,000,000 for new classrooms

HOW TO GET A TWO-WAY RADIO PERMIT

In order for a private contractor to use two-way radio, he must show that the desired communications are essential to life or property or a practical necessity for the benefit of public welfare. An application must be filed with the FCC on blank 401-C for a construction permit for provisional station, and with this a supplementary statement explaining reasons for wanting the station must be submitted. For each station to be located at a separate fixed point, separate applications must be filed in the same way. In the case of mobile units, one blanket application is all that is required. Certain frequencies are available for provisional stations. Wave lengths are assigned by the FCC when application is processed. For each station at a fixed point an operator must have a license; for a mobile station operating on frequencies above 25 megacycles operators may be unlicensed. Any maintenance adjustments, however, must be made by a person with a radio-telephone second class or higher operator's license. The processing time for construction permits at FCC is running now about 10 weeks.

which are needed by 1950.

In Houston, Tex., a $2,000,000 high school for Negroes is in the final stages of planning.

The Department of Education, Province of British Columbia, Can., has appropriated $50,000,000 for school construction in the province.

At Minneapolis, Minn., the board of education is ready to go ahead with plans for building additions to two elementary schools and the building of one new one—to be financed by a bond issue of $1,438,000.

According to figures submitted to G. Tyler Miller, superintendent of public instruction in Florida, the school building needs of St. Petersburg for the next ten years will call for about $2,843,000, while in the same state the Fort Meyers school board has approved a junior-senior high school plant which eventually would cost about $1,145,600 and accommodate 1,500 students.

Increased enrollments

About $18,000,000 worth of school construction in Florida in the last two years has not been enough to provide for the 32,044 new pupils that were added to the enrollment during the same period. School authorities estimate that about $200,000,000 worth of new schools are needed in Florida.

N. Y. State Board of Regents has asked for $18,000,000 for emergency school building needs.

A Boston, Mass., school committee legislative program calling for $1,500,000 annually for the construction of needed elementary school buildings was recently placed before Mayor James M. Curley for his approval before going to the Massachusetts legislature.

Four new elementary schools and a new junior high school are to be constructed on the west side of Manhattan, New York City, at an estimated cost of $15,000,000.

Many schools represented at eastern ASEE meeting

Engineering educators of 21 eastern colleges and universities attended the American Society for Engineering Education at Drexel Institute of Technology, Philadelphia, last month.

Delegates of the Middle Atlantic Section of the ASEE were joined by industrialists and government representatives for a schedule of meetings and conferences concerned with education problems of chemical, civil, mechanical, and electrical engineering, mathematics and physics.

At one of the sectional meetings a panel of government, education, and industry representatives considered the future demand for civil engineering graduates. In another talk, William F. Ryan, vice president of the Eastern Zone of the National Society of Professional Engineers, asked for a higher professional outlook among engineering graduates.

L. B. Young, assistant to the chief engineer for maintenance of way, Pennsylvania Railroad, said that while the engineering graduates of today are superior to those of the past in some respects, many are lacking in initiative, training and ability.

◆

Kansas examinations show many surplus engineers

More than 1,500 applicants with engineering training recently took civil service examinations to fill 712 posts for the Kansas State highway department, the State Board of Agriculture, the state architect's office and Kansas University.

Although the state Civil Service Commission pointed out that not all eligibles were available and that some of the positions were already filled on a permanent basis, it pointed out the competition for jobs. There were six applicants for the one position of state highway engineer. Of these, three were eligible.

Nine other classifications were open for application, ranging from civil engineer one through five and engineering aid one through three.

Commissioners pointed out also that in the case of many applicants, the lack of experience was a leading factor in their not meeting the required qualifications for certain positions.

◆

PHS needs men to conduct pollution control program

Qualified technical personnel to aid in carrying out the comprehensive national water pollution control program are needed by the Public Health Service, according to Carl E. Schwob, chief of the Division of Water Pollution Control, PHS.

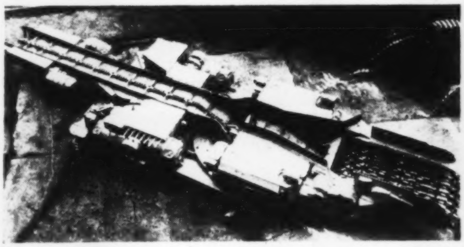
Reserve commissions in the PHS and civil service appointments are open for qualified sanitary engineers, biologists, bacteriologists and chemists. Salaries range for positions in the commissioned corps from $3,391, junior assistant grade (2nd Lt.), to $6,056, senior grade (Lt. Col.). Positions from P-3 to P-7 are also available.

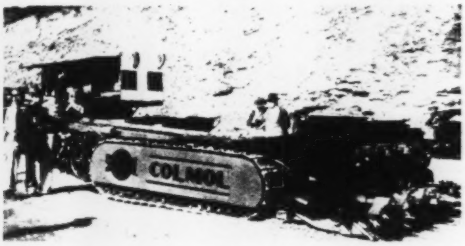
◆

Training films offered for sanitary engineers

A classified list of Communicable Disease Center film strips and motion pictures is available from the Public Health Service, Federal Security Agency, Atlanta 3, Ga. These films are available on a 30-day free loan to schools of sanitary engineering, other interested persons.

Subjects covered by the films on sanitation and sanitary engineering include garbage and refuse disposal, insect control, rodent control, sewage treatment and water supply.





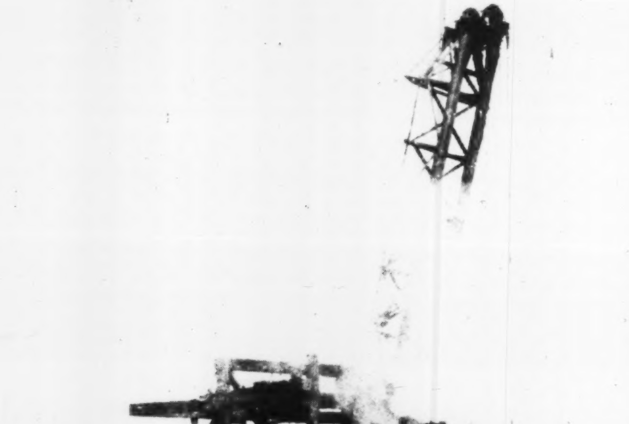
COAL TODAY, ROCK TOMORROW?—Mechanical miners are being developed by nearly every mining-machine maker. Joy Manufacturing Co., of Pittsburgh, has revealed recently its Continuous Miner (at left) and has put it in production. The Colmol is a Sunnyhill Coal Co. pilot model completed last October. A $250,000 research fund has been allocated for development of a mining-loading machine by Bituminous Coal Research, Inc. The Joy machine is claimed to dig and handle two tons per minute. Both machines do away with blasting entirely and permit continuous mining. Is continuous tunneling to follow?

Special Rig Drives Double Batter Piles

Two **PILEDRIVERS** were constructed to meet exacting conditions involved in driving some 5,000 concrete piles—most of them with a two-way batter—for a 10½-mile section of the second Mokelumne Aqueduct in California.

The line will increase the water supply for the East Bay Municipal Utility District serving Oakland, Calif., and other nearby cities and unincorporated areas (ENR Sept. 5, 1946, vol. p. 310 and Jan. 8, 1948, vol. p. 50).

Close proximity of the new line to the existing line made the development of the special drivers necessary. Further difficulties were encountered in transporting the piles over poor ground. Of interest in the design of the pipeline is a swivel type pipe support to accommodate movement due to changes in water pressure and expansion in the steel pipe. Special rigs to meet these conditions were built by the forces of Ben C. Gerwick, Inc., contractor on this portion of the project.



A LOW PIVOT on the piledriver leads was required for the second Mokelumne Aqueduct because of the nearness of a line built some 20 years ago. Falsework was required to support the equipment over some of the marshy sections.

On most piledrivers constructed to drive double-batter piles, the point of support for the leads is somewhere near the upper end. In the case of the second Mokelumne Aqueduct such a driver could not drive some of the piles because of the nearness of the existing pipeline. If the normal type of driver with its pivot near the top of the leads had been used, it would have had to be set up about on the line of the present aqueduct.

Accordingly, a driver was devised that has the support of the 56-ft. leads only 16 ft. from the bottom of the leads. Thus, all of the 16-in. square concrete piles could be conveniently driven. Pile lengths vary from 16 to 55 ft.

Two bearing shafts permit rotation of the lead. One shaft, situated parallel to the lead and to the skids is 3 in. in diameter, allowing the lead to be rotated in and out. A second shaft with an 8-in. diameter permits rotation of the lead to the side. This shaft is larger, supporting the lead on a cantilever arm of about 2 ft. The 3-in. shaft takes shear only.

With this arrangement the lead can be rotated as much as 30 deg. in any direction from the vertical.

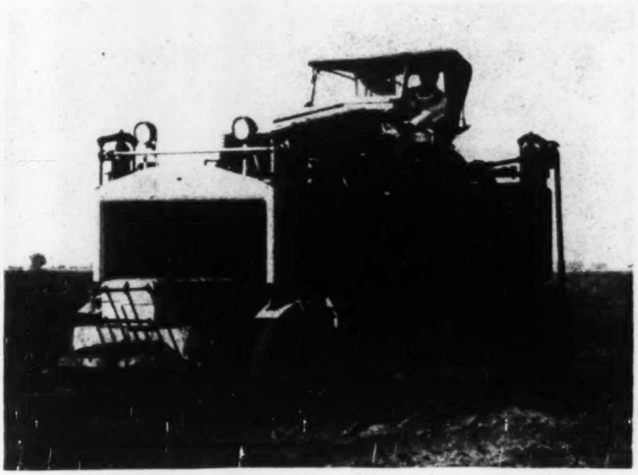
The drivers are powered by a 60-hp. steam boiler. A three-drum steam winch, plus an additional swing winch, power the movements of the lead. Piles are driven by a Vulcan No. 1 steam driver.

Because of the soft ground, the skid timbers are of special construction. Instead of the usual 12 x 24-in. skid timbers, 12 x 36-in. skids 30 ft. long are used, with 2 x 12-in. hardwood (iron bark) plates set into them to act as a wearing surface.

Transportation difficult

Because this section of the pipeline is across marsh and delta land, transportation of the piles to the driver was difficult. The piles were cast at the contractor's yard in Petaluma, Calif., located on the north arm of San Francisco Bay. From here they were barged to one of two unloading points located on sloughs near each end of the job. At

THE PILEDRIVER LEAD is supported by two shafts so it can pivot in both directions. The small shaft in the lower right permits out and in movement and the large shaft permits rotation to either side. This shaft is larger because it resists cantilever action as well as shear.



A LUMBER CARRIER was used to bring piles mounted on a sled to the driver.

one point a floating crane was used for unloading and at the other a truck crane was used. The piles were set on wooden sleds built to fit lumber carriers. Where the ground was firm, four piles could be set on a sled. Where the ground was soft, two and sometimes only one was set on a sled for movement to the job.

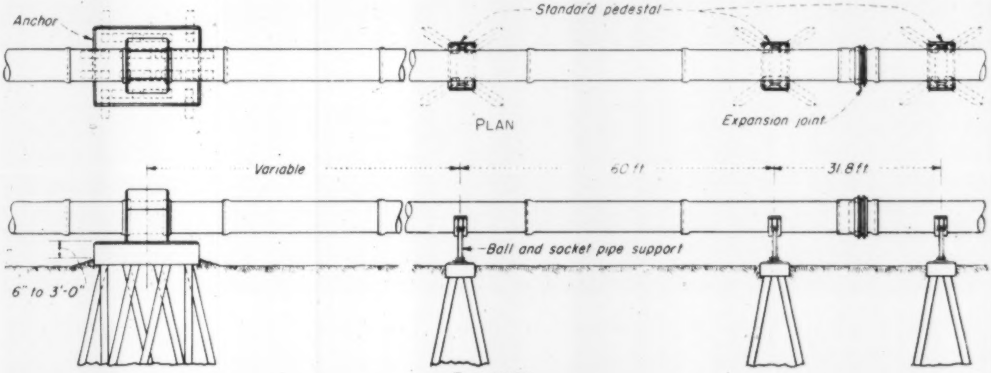
The lumber carriers then carried the piling over existing state and county roads and special construction roads as near the driver as possible. When the ground conditions became particularly bad, the carrier lowered the loaded sleds to be dragged to the driver by a tractor.

These concrete piles, formed in clusters, will support a 69-in. steel pipe. Two types of pile clusters are involved: One consists of sixteen piles, all of them on a one-way batter, to support a footing on which will be mounted an anchor block for the pipeline. The second are sixteen smaller clusters set between the anchors. These consist primarily of four piles driven on a double batter. Where extremely poor soil conditions are encountered and additional support is required, one or two extra piles are added to these smaller clusters. These footings are spaced 60 ft. apart except at the expansion joint section midway between the anchor clusters. Here the spacing is 31.8 ft.

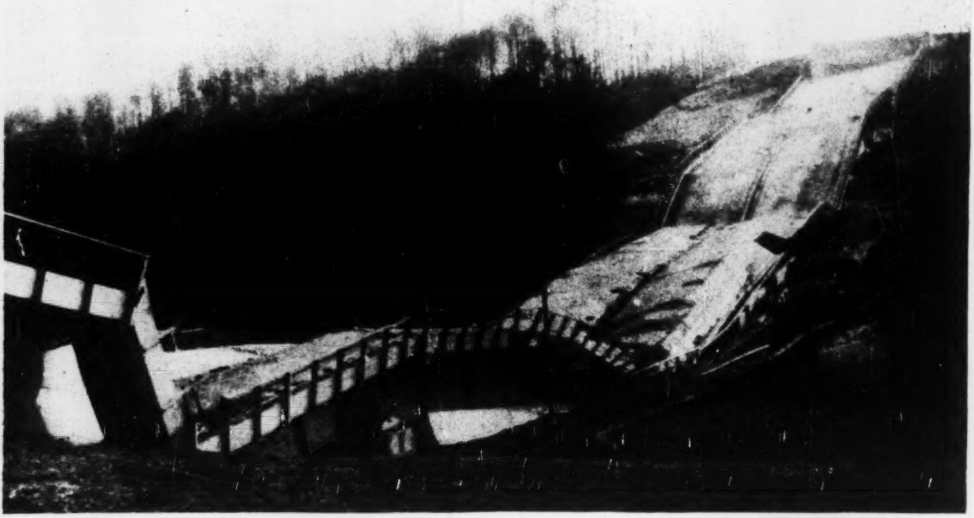
Provisions for expansion

Support of the pipe on these intermediate clusters will be by a ball and socket arrangement that will permit movement due to expansion or changes in water pressure. These supports consist of two vertical members and one diagonal. Each of the vertical members is located on a base plate situated just above two of the double-batter piles. At each end of the vertical members is a ball and socket. The diagonal members are staggered so that on every other support, the diagonal is in a different direction.

This project is an East Bay Municipal Utility District job, J. S. Longwell, chief engineer and general manager. E. L. Macdonald is manager of the Mokelumne Division. Don Weaver, designer of the special piledrivers, was general superintendent for Ben C. Gerwick, Inc., contractors.



DOUBLE BATTER PILES are required to provide resistance to pipeline movement. There are sixteen of these four-pile clusters between the sixteen-pile clusters that support the anchor blocks. Pipe expansion is absorbed in a special joint.



Such war-wrecks as this, the Sulzbach viaduct west of Munich, made necessary the program of . . .

Reconstructing the Autobahn Bridges

Colonel Heath Twichell

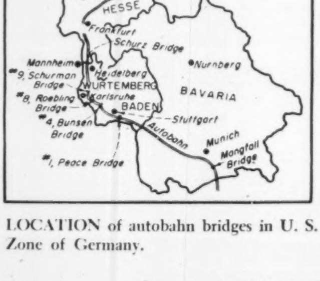
Professor of Military Science
Rensselaer Polytechnic Institute, Troy, N. Y.

ONE of the principal lines of communication in the U. S. Zone of Germany is the autobahn route that starts at the Austrian border south of Munich and runs in a great arc through Stuttgart, Heidelberg and Frankfurt, to the northern zone boundary near Kassel.

How this highway was put back in service by the reconstruction of its wrecked bridges is one of the important developments of our military occupation. In large measure it illustrates a basic tenet of our general policy—to aid the Germans to help themselves—and on the bridge work it progressed from our first doing the work with mixed American and German crews to the present time when we do little more than designate the structures to be rebuilt and aid in material procurement. This article sets forth the progress that has been made.

When invasion loomed, Hitler ordered the destruction of all German bridges in front of the Allied advance. The ensuing total wreckage of the famed bridges over the Rhine, a formidable barrier, may have been justified on military grounds, but no such justification existed for blowing up all the autobahn bridges, few of which crossed important military obstacles, and most of which could be by-passed or detoured. Their senseless destruction by Hitler's orders merely hindered recovery, without materially slowing the Allied advance.

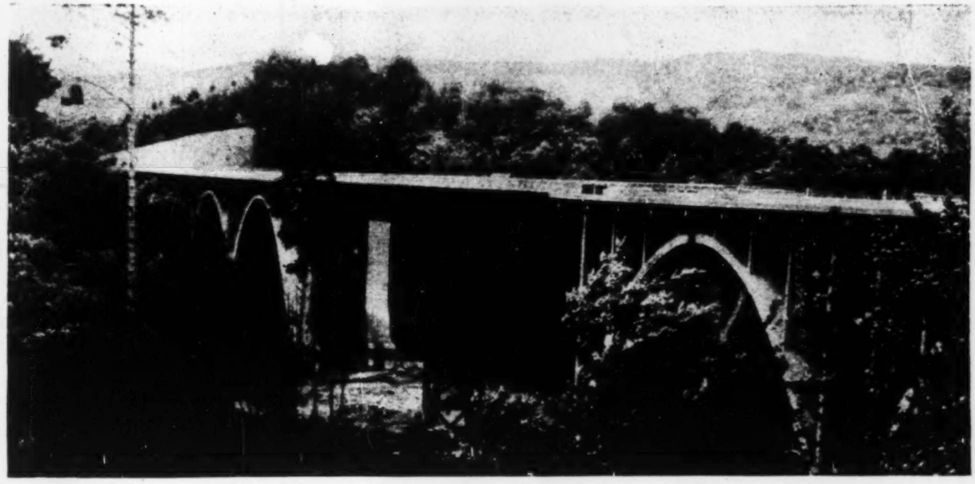
Replacing wrecked short spans on the autobahn by temporary military bridges was a simple job for American Engineer troops, and restored an expedient road net reasonably ample for military traffic even though detours were necessary where long bridges had been wrecked. However, the untimely death of General George S. Patton, in Dec. 1945, while traveling one of these detours, focused attention on this situation, and caused Lieut. Gen. Geoffrey Keyes, commanding the Seventh U. S. Army, to order the elimination of this detour as an initial major project of bridge reconstruction.



LOCATION of autobahn bridges in U. S. Zone of Germany.

Troops and war prisoners

The work was assigned the 333rd Engineer Special Service Regiment, a veteran heavy construction unit, then commanded by the writer, which had recently completed the General Marshall and Patch bridges, all-welded steel structures across the Rhine at Mainz. One company of the regiment was placed on the job, assisted by 350 former prisoners of war, veterans of the 1st Battalion, 1st German Railway Engineers. This battalion, specially trained in building pre-fabricated railway bridges, had been captured intact in Italy. Assigned as a prisoner-of-war unit to help the 333rd Engineers on the Rhine bridge job, it had rendered excellent service there. When released from prisoner-of-war status, most of the men elected to remain as hired civilians, and this unit came to be known as Balke's outfit,



STEEL TRUSS SPANS on steel towers replace two concrete arches in the now-named Peace Bridge, outside Stuttgart.

from the former adjutant and senior member of the organization.

This first major autobahn job involved replacing four collapsed spans of a concrete multiple arch bridge across the Neckar River and Canal near Mannheim, by a semipermanent two-way class 40, one-way class 70 bridge.

Because of the difficulty of driving piles through the rubble, it was necessary to locate the new bridge, over 1500 ft. in length, upstream of the old, and to build curved approaches at both ends. The approved design called for a double wood deck, 6 in. thick, resting on steel stringer spans 70 ft. long, composed of six 39-in. wide-flange beams. Bents of tubular steel piling, driven to an average penetration of 25 ft., composed the 22 piers of this structure, and it was on this work that opportunity was taken to compare German diesel pile driving hammers with standard American air hammers as reported in ENGINEERING NEWS-RECORD April 3, 1947, p. 522.

Completion of this structure eliminated an 8-mile detour through Mannheim, and marked the first step in the permanent rehabilitation of the autobahn in the American Zone. To select an appropriate name a poll was taken among the German workers, which resulted in picking that of Karl Schurz, German-American patriot and statesman.

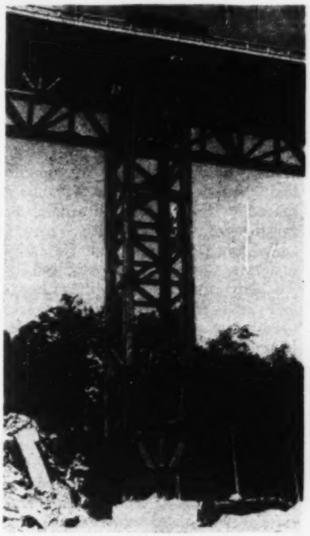
Aid to German contractors

The speedy completion of the Schurz bridge caused the transport division of U. S. military government in Wurtemburg-Baden, faced with some difficulties in rebuilding bridges between Karlsruhe and Stuttgart, to request military assistance. These difficulties arose from the lack of German vehicles, engineer equipment and fuel, shortages of structural steel and other building supplies, and the reduced efficiency of German workmen. This request for help was granted and the job was assigned to the 333rd Engineers.

The work involved replacing four major autobahn bridges by semipermanent two-way structures constructed so as not to interfere with later rebuilding of the original bridges. Work was to be performed by military government contracts, using German funds, labor and material. The military was to assist by operating transportation and equipment, and by suggesting American methods to speed the work.

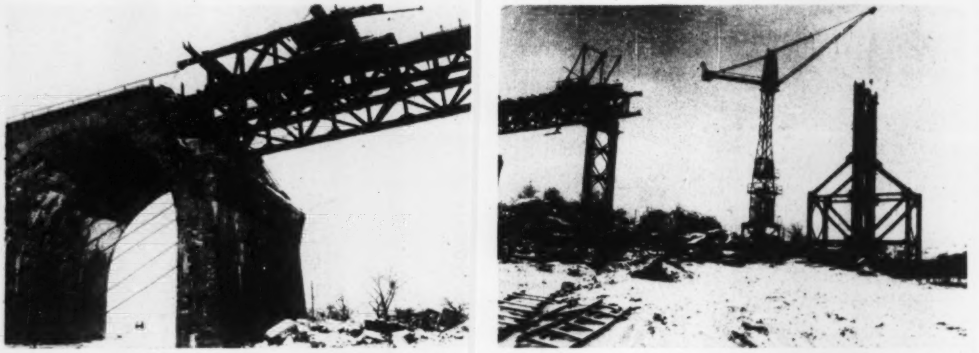
The first of these bridges, No. 9 at Karlsruhe, a three-span continuous plate girder structure 820 ft. long had been completely wrecked when its two abutments were demolished. The reconstruction work, performed by local German contractors required placing 5,200 cu. yd. of concrete in the abutments as well as repairing and raising the old spans.

Charges placed in the demolition chamber of the center footing of bridge No. 8, near Karlsruhe, had destroyed the two concrete arches of this structure and damaged the footing, while leaving the abutments and approaches intact. The availability of German prefabricated railway trusses in captured enemy stocks, plus surplus wide-flange beams and other salvaged material influenced the design of the replacement structure, which called for two R-type trusses ENR Oct. 20, 1947, p. 594) totaling 263 ft. in length, resting on the abutments of the old bridge and on a center pier built of British light steel trestling.



CENTER PIER of Peace Bridge illustrates the German R-type truss construction used on the rebuilt autobahn bridges.

The damaged center footing was removed and replaced by reinforced concrete. Erection of steel on falsework, performed by Balke's outfit, with some military assistance in the way of equipment and transportation, was



RECONSTRUCTION OF BRIDGE No. 4 at Kampfelbach involved special features in the stabilization of the west arch by cables (left) and in the use of high pendulum piers which had to be temporarily braced during erection (right).

completed before cold weather set in. Pouring the cast-in-place concrete slab, a job made difficult by the fact that the bridge was located on a combined vertical and horizontal curve, was postponed until spring, when it was performed by a local contractor.

A major rebuilding job

The biggest problem was met in reconstructing Bridge No. 4 near Pforzheim, at Kampfelbach, a high multiple arch structure, eight spans of which had been demolished by charges placed in the base of the piers, leaving the remaining end arches unstable and depositing 20,000 cu. yd. of rubble along the center line of the bridge. To assist the German and American engineers employed by the various agencies concerned with this problem, Joseph Weber, one of the leaders in developing German war bridges, was employed as a consultant. After considering various possibilities, it was decided to erect a continuous R-type truss of four spans by the cantilever method, resting on three pendulum or rocker piers, the heaviest ever attempted, so as to eliminate falsework. Availability of captured stocks again was a factor in selecting this design.

Contract for erecting this unique structure was awarded Grun and Bilfinger, the firm that built the original bridge. Subcontract for steel erection was let to Stahlbau Rheinhausen, a Krupp subsidiary experienced in the erection of prefabricated bridges. Lt. Col. William D. Neill, was in charge for the transport division of military government, while Carl Addison, a former major in the regiment, was superintendent on the job for the 333rd.

This composite force of German and American bridge experts solved a number of unusual problems that arose during the work. Removal of rubble to permit examination of the original footings showed one that had been damaged, requiring pressure grouting for stabilization. Three new bases designed to support the pendulum piers were constructed on the old footings. These piers, the tallest 132 ft. high, were built out of stock bridge parts, some of which were also used to provide temporary bracing to prevent the piers overturning during construction. (See illustration above.)

Before erection of the main span could proceed, it was necessary to stabilize the West end arch. This was done by drilling inclined holes through the masonry, near the top and bottom of the last two piers, and by inserting 1¾ in. steel cables in these holes secured to horizontal wide-flange beams. These cables were then stressed hydraulically until the total load on the cables equalled that of the missing arch ring under half load, which restored the original shape and stability of the arch.

While this operation was going on, the counterbalance span was erected on the arch next the end, and cantilevered to the last pier. When seated on this pier, the extra weight of the span helped stabilize it. The counterbalance span was then readjusted to slope for cantilevering from it to the first pendulum pier, and this operation was commenced when the stabilization of the end arch described above was completed.

Erection of the first pendulum pier by gantry crane proceeded simultaneously with cantilevering the first span, deflection of which for juncture with the pier was accurately calculated. When seating on this pier was completed, the first span, secured to the masonry structure by tackle, was disconnected from the supporting portion of the counterbalance span, from which it was lowered into position on a temporary seat by jacking, and placed at an elevation to permit cantilevering to the second pier. This same procedure, with variations, was used in seating the truss on the third pier and on the east abutment.

Considerable time was saved by using precast slabs for the deck. American trucks and equipment handled most of the construction material on this job, and American construction methods helped speed the work. The greatest help, however, was the presence of American men and machines, which encouraged the Germans to continue placing steel practically without interruption throughout the coldest winter in over 200 years. This was done without disabling accidents, a notable construction record.

Completion of Bridges 9, 8 and 4 permitted reopening 31 miles of the autobahn. Following previous precedent a research was made for illustrious German-American names of peaceful import, that would be agreeable to occupation forces and to local authorities. As a result Bridge No. 9 was named for Jacob G. Schurman, former president of Cornell University and American ambassador to Germany from 1925 to 1929. Bridge No. 8 was dedicated to John A. Roebling, German born engineer of Brooklyn Bridge fame. Bridge No. 4 was named for Robert Bunsen, German scientist and former professor of chemistry at Heidlberg University.

Former P.O.W.'s become contractors

Completion of the Schurz, Schurman, Roebling and Bunsen bridges left only Bridge No. 1 outside Stuttgart to be rebuilt. Two spans of this multiple-arch twin-rib bridge had been demolished leaving a gap 330 ft.

across and 115 ft. high, which it was decided to span by two simple R-type trusses resting on three new steel piers, the center one fixed. Contract for this work was let to Balke's outfit, which, having preserved its identity under many vicissitudes, was now established as a contracting firm, employing many members of the old organization.

The 333rd Engineers having been inactivated and the writer having returned to the United States, a handful of military specialists and key civilians needed to assist military government were transferred to the office of Lt. Col. T. de F. Rogers, engineer for U. S. Constabulary, who saw the project through. Trusses were erected partly on falsework and partly by cantilevering. Forms from bridge No. 4 were transported to the site and used to precast slabs there.

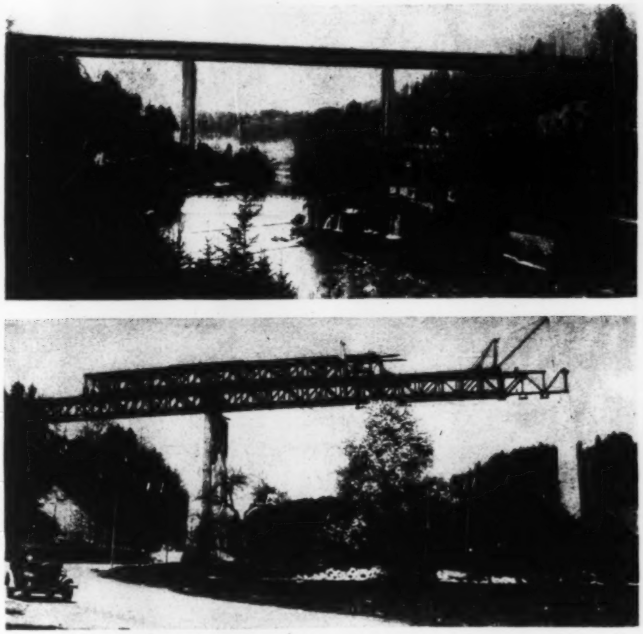
Work on Bridge No. 1 was commenced in July and completed in December, 1947, thus reopening the main autobahn through the American zone to unobstructed travel. To celebrate this event, and to commemorate the character of the effort, the structure was dedicated at Chirstmas and named the Peace Bridge. On a permanent bronze plaque the following words have been inscribed in several languages:

"This bridge is here only because of the peaceful, cooperative, and constructive ambitions of its builders. God grant that each traveller who crosses it be inspired by these same ambitions, and we will never have another war."

In these operations, five major bridges totaling 3630 ft. in length were rebuilt in a period of 22 months at a cost in labor and material, mostly German, of 1,500,000 man hours of work, 2,500 metric tons of structural and reinforcing steel, 8,500 cu. yd. of concrete, and about 850,000 ft. b.m. of lumber.

Other bridges of lesser and greater magnitude (the Mangfall viaduct south of Munich being an example of the latter) have since added to the total of accomplishment. American help in advancing the work many months has shortened the time of travel on the main north and south highway route through Germany by from two to three hours.

It was fortunate that occupation authorites had at their disposal to solve this problem so many skilled engineers, both military and civilian. The unique force of bridge builders assembled on this project, combining the best German technical skill with the most advanced American machinery and methods, worked together with greatest harmony and enthusiasm to overcome many supply and construction problems, while accomplishing a major reconstruction task. Lessons were learned to advantage on both sides. Americans had an opportunity to use German bridge equipment that was developed in extensive operations of World War II, and gained information that should be of considerable value in improving American military bridges. Germans should have learned some lessons from the Americans that will help speed their own reconstruction tasks.



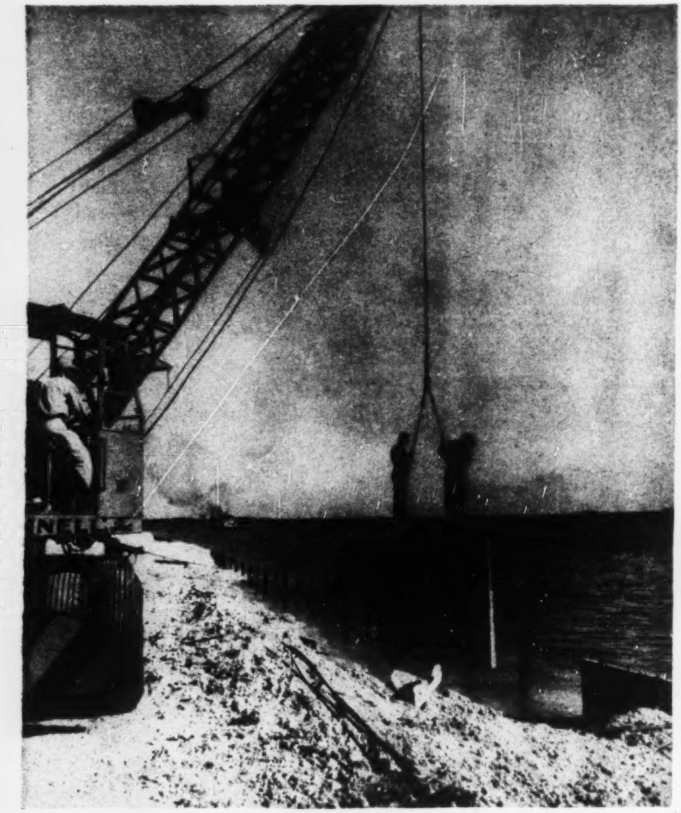
BEFORE AND AFTER WORLD WAR II at the Mangfall viaduct. As a plate girder structure its 354 ft. main span was world famous. Rebuilt as a truss bridge it still is spectacular if less notable.

Engineer Discusses Earthquake Failure

Steel, concrete, or woodframe structures designed for resistance to lateral force and honestly built rarely fail in earthquakes, H. J. Brunnier, San Francisco structural engineer, told a group of Japanese engineers in Tokio recently. The occasion was a trip by Mr. Brunnier at the request of the Far East Command to investigate and report on the recent earthquake damage at Fukuii.

Damage is due not to the kind of material used nor the type of construction attempted, Mr. Brunnier said, but to poor workmanship, inferior quality of materials, improper design or a combination of the three. Much damage is not due to structural deficiency, he continued, but to catastrophes that accompany the earthquakes. He cited the San Francisco earthquake in 1906 in which earthquake damage to multi-story buildings was slight even though they were of inferior construction as compared with modern buildings. He stated that fire damage did most of the destruction at San Francisco.

In a subsequent off-the-record report on his observations of the Fukuii earthquake damage presented at a meeting of the Structural Engineers Assn. of California, Mr. Brunnier pointed out that fire damage was a complicating factor in Fukuii. Many of the structures had been gutted during wartime fire bomb raids and were later again gutted by fire following the recent earthquake. It is very hard to decide, he concluded, what part of the damage is attributable to the earthquake and what part to the fires.



SETTING BULKHEAD SLABS behind rail-steel piles for Biscayne Bay seawall

Light Seawall Built at Fast Clip

Light bulkhead construction has been developed into a high-speed operation in the creation of one of the newest pieces of real estate in Miami's Biscayne Bay. Harbor Island, extending northward from North Bay Causeway, has the shape of a two-tined fork. The man-made, dredged rockfill islet has a total waterfront length, all bulkheaded, of 10,000 ft.

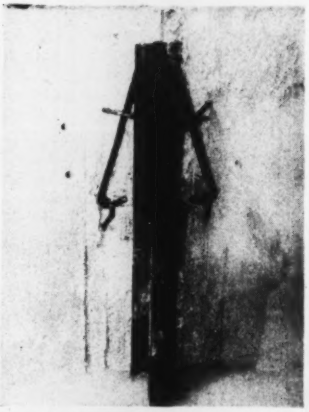
The rate of bulkhead construction during the peak of work was 500 ft. a day. Work performed at this rate excluded steel-rail piledriving and concrete-slab casting (see illustration). The overall cost was about $20 per lin.ft. of wall.

The bulkhead vertical load is taken by 90-lb. rails shod with 6x6-in. steel plates, driven on 10-ft. centers into lime-silica rock, 10 ft. below mean low water. Notches torch-cut into the rails accommodate slab hangers of bent ¾-in. reinforcing rods (see illustration).

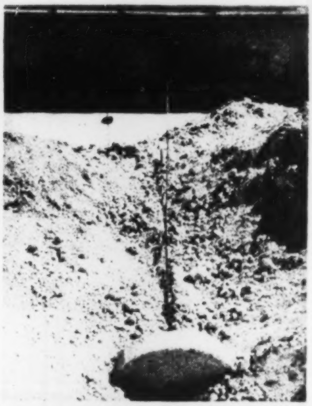
Precast slabs hung in place

Hung shoreward of the rails, the precast slabs are 10 ft. by 10 ft., tapering in thickness 6 in. to 4 in., bottom to top. They are shimmed 2 in. off the rail base. Reinforcement is galvanized welded mesh of horizontal No. 3 wire at 2½ in. and vertical No. 8 wire at 12 in., cast 1¾ in. from the seaward face. Slabs are secured near their lower edges, by ½-in. bars bent around the rails and hooked into eyes cast into the slabs.

Horizontal loads are taken by reinforced-concrete disc deadmen buried in fill 20 ft. inshore from each rail

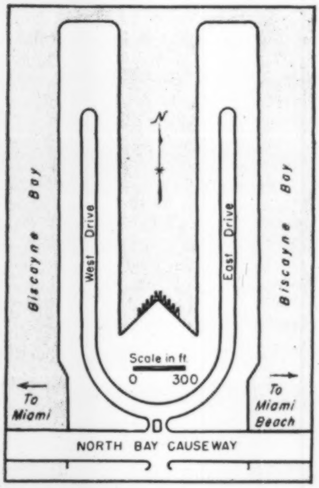


HOOKS, EYES AND TIES of reinforcing steel facilitate fastening slabs to rail-steel piles. View from water side.



DISC DEADMAN takes backfill reaction through corrosion-resistant tie-rod attached to pile on wall's water side.

COPING FORMS, include a curved steel element for wave-damping section. Pilaster concrete already poured around piles.



MAN-MADE ISLANDS in Miami's Biscayne Bay are characterized by carefully formed shorelines. This one is Harbor Island.

pile. The deadmen are precast 30 in. dia. and 5 in. thick. Tie rods are ½-in. copper-coated steel rods with threads upset rolled to avoid breaks in the protective covering. A tensile strength of 15,500 lb. per tie is about twice the computed horizontal load.

The slabs are capped to 6 ft. above m.l.w. by a poured-in-place coping 1 ft. 8 in. wide and 6 in. thick over the slab, projecting 2 in. inshore and 1 ft. 2 in. outshore The under surface of the outshore projection is curved downward, with a surface of 8-in. rad., to damp high waves. Doweled expansion joints of ¾-in. impregnated felt occur in the coping at every fourth pile position. Rail piles are encased, down to slab-bottom level, in 10-in. rad. semi-circular plain-concrete pilasters.

Construction procedure

With piles driven and slabs and deadmen cast, the builder moved quickly into full stride. He hung his slabs, installed the deadmen and ties, back-filled the deadmen and brought the slabs into line by taking up nuts on the tie-rod thread at the rail-top. He bolted pilaster steel forms to the adjoining slabs, through holes cast in the slab, and poured the pilasters. Next, he attached, similarly, steel forms for the curved outshore coping projection, built wooden inshore headers, set steel and braced the assembly for the pour. Lift rings precast in the bulkhead slab upper edges tied the coping down. The truck cranes that set the slabs also handled a concrete bucket for pours.

When forms were stripped, backfilling and fine-grading ensued. All Harbor Island fill and concrete aggregate, 1,200,000 cu. yd. of it, came from dredging in the vicinity and from the island's 1600x450-ft. boat-anchorage basin.

The bulkhead design is patented by Joel Hurt, who heads the Sea-Bay Corporation, developer of Harbor Island. Construction was by the owner's forces.

Canton Counts Its Traffic by Postcard

Although the postcard method of making origin and destination traffic surveys is not new—and not even highly regarded in many localities—the success of such a survey conducted in Canton, Ohio, demonstrates its practicability and accuracy, under certain conditions.

Admittedly, many cities have traffic patterns and geographical barriers not conducive to an accurate traffic survey by the postcard method. But the Canton survey, undertaken as a low-cost federal-aid research project, surpassed all expectations in the percentage of postcard returns. In addition, 24-hr. screen line traffic counts taken within the city limits checked within 5 percent the volume of trips crossing the screen line, according to interview data.

Large percentage of return

Of 23,780 questionnaires mailed to passenger car owners, 12,500 (52.5 percent) were filled out and returned. Similarly, of 3,390 truck questionnaires mailed, 1,790 (52.7 percent) were returned. This surprisingly large percentage of postcards returned was due in large measure to the widespread radio, newspaper and poster publicity given to the traffic survey.

The traffic check cost $10,000, with the Public Roads Administration contributing about 50 percent, and the state and city contributing the remainder. The Ohio Department of Highways made the survey, working in close cooperation with the city. The city is using the results to prepare a master plan of major street improvements.

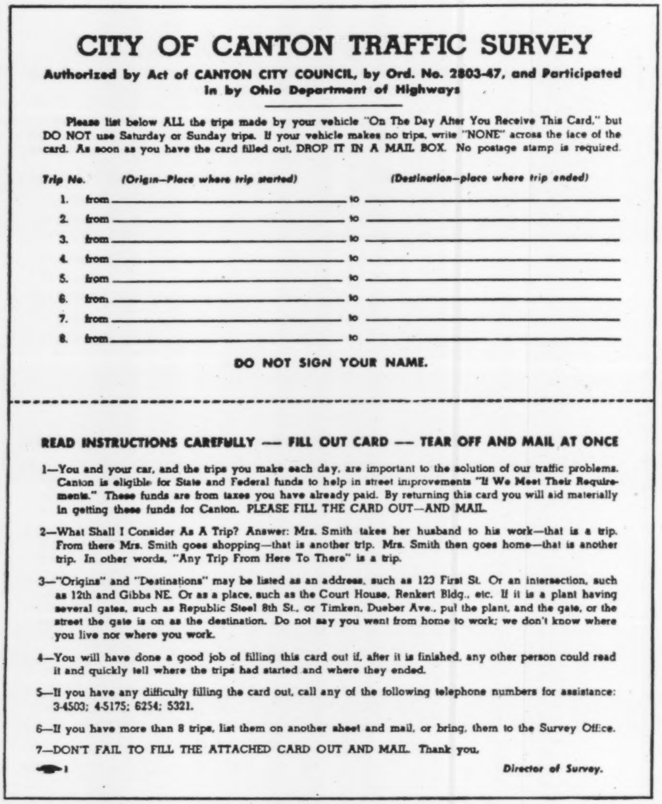
One of the first steps was to divide the Canton metropolitan area (population about 120,000) into 44 internal zones. These were laid out in conventional manner based on the following factors: (1) heavy industry was segregated from business and residential areas; (2) the entire downtown business district was included in one zone; (3) zone sizes in residential areas were based primarily on population density; (4) zones were bisected by primary or arterial streets where possible and (5) zone boundaries were adjusted so a screen line check could be made by actual traffic counts at control points.

Zones were indicated on a master map and numbered from 1 to 44. In addition, identifying numbers were given all 22 state, federal and county routes radiating from the city that carry more than 500 vehicles per day.

A complete list of owners of all passenger cars and trucks registered in the Canton metropolitan area was then prepared. Each person on this list received a return-addressed stamped card through the mail, containing space for listing one day's trips of the person's vehicle. The cards were mailed out at a time that would preclude the listing of weekend

TABLE OF SCREEN LINE AND EXTERNAL TRAFFIC COUNTS

	24-hr. Count at Check Line	External Survey (24-hr. Count)	Deviation (percent)
Eastbound:			
Passenger Cars	31,470	30,730	— 2.4
Trucks	5,260	4,310	—18.0
Total	36,730	35,040	— 4.6
Westbound:			
Pasengers Cars	30,910	29,910	— 3.2
Trucks	5,410	4,210	—22.2
Total	36,320	34,120	— 6.1
Both Directions:			
Passenger Cars	62,380	60,640	— 2.8
Trucks	10,670	8,520	—20.1
Total	73,050	69,160	— 5.3



CITY OF CANTON TRAFFIC SURVEY

Authorized by Act of CANTON CITY COUNCIL, by Ord. No. 2803-47, and Participated in by Ohio Department of Highways

Please list below ALL the trips made by your vehicle "On The Day After You Receive This Card," but DO NOT use Saturday or Sunday trips. If your vehicle makes no trips, write "NONE" across the face of the card. As soon as you have the card filled out, DROP IT IN A MAIL BOX. No postage stamp is required.

Trip No. *(Origin—Place where trip started)* *(Destination—place where trip ended)*

1. from ____________________ to ____________________
2. from ____________________ to ____________________
3. from ____________________ to ____________________
4. from ____________________ to ____________________
5. from ____________________ to ____________________
6. from ____________________ to ____________________
7. from ____________________ to ____________________
8. from ____________________ to ____________________

DO NOT SIGN YOUR NAME.

READ INSTRUCTIONS CAREFULLY — FILL OUT CARD — TEAR OFF AND MAIL AT ONCE

1—You and your car, and the trips you make each day, are important to the solution of our traffic problems. Canton is eligible for State and Federal funds to help in street improvements "If We Meet Their Requirements." These funds are from taxes you have already paid. By returning this card you will aid materially in getting these funds for Canton. PLEASE FILL THE CARD OUT—AND MAIL.

2—What Shall I Consider As A Trip? Answer: Mrs. Smith takes her husband to his work—that is a trip. From there Mrs. Smith goes shopping—that is another trip. Mrs. Smith then goes home—that is another trip. In other words, "Any Trip From Here To There" is a trip.

3—"Origins" and "Destinations" may be listed as an address, such as 123 First St. Or an intersection, such as 12th and Gibbs NE. Or as a place, such as the Court House, Renkert Bldg., etc. If it is a plant having several gates, such as Republic Steel 8th St., or Timken, Dueber Ave., put the plant, and the gate, or the street the gate is on as the destination. Do not say you went from home to work; we don't know where you live nor where you work.

4—You will have done a good job of filling this card out if, after it is finished, any other person could read it and quickly tell where the trips had started and where they ended.

5—If you have any difficulty filling the card out, call any of the following telephone numbers for assistance: 3-4503; 4-5175; 6254; 5321.

6—If you have more than 8 trips, list them on another sheet and mail, or bring, them to the Survey Office.

7—DON'T FAIL TO FILL THE ATTACHED CARD OUT AND MAIL. Thank you.

Director of Survey.

GOOD RESULTS—Of 27,200 postcards mailed to car owners in Canton, Ohio, 14,300 were returned promptly. Complete instructions on one side of the cards sold motorists on cooperating in furnishing origin-destination data.

trips. They were in two colors—yellow for trucks and pink for passenger cars—to facilitate hand sorting as they were returned, and each carried its zone number in the upper right-hand corner.

Typical week day chosen

Data obtained from the returned cards were coded, expanded and adjusted to represent 24-hr. vehicle movements for a typical week day. Expansion factors for both trucks and passenger cars were computed for each of the 44 zones, based on the ratio of the number of cards received to the number mailed out. These coded data then were punched on IBM tabulating cards to facilitate preparation of the origin-destination tables.

Simultaneous with the postcard, or internal survey, the state highway department conducted an external survey which included a 24-hr. outbound traffic origin-destination survey of passenger cars and trucks on all highways and streets carrying more than 500 vehicles per day and intersecting the boundaries of the metropolitan area. Drivers of through vehicles which did not stop in Canton also were asked what route was taken in entering the city. From this information all through traffic could be traced, by routes, across the city. Moreover, the volume of through traffic plus that disclosed by the postcard survey gave the total traffic using Canton's streets in a single day. All trips with origin and destination outside of Canton were discarded from the postcard survey to avoid duplication of external survey data.

The external traffic survey disclosed that a large portion of the traffic had not passed through the city by choice. Of 16,000 vehicles interviewed in a 24-hr. traffic count on U. S. Highway 30 just inside the west city limits, 4,300 signified no desire to stop in Canton, although under the existing routing they had to pass through the congested business district.

At the request of the Public Roads Administration, a screen line check was made of the origin-destination data obtained by the survey. Fortunately, Nimishillen Creek which traverses the city from north to south, with nine bridge crossings, provided a natural screen line since it bisects the city in such a position that few trips would require crossing it more than once in traveling from origin to destination.

As shown in the accompanying table, results of the 24-hr. traffic count of all vehicles except buses crossing the screen line, check within an average of 5 percent the number of trips that crossed the screen line according to the origin-destination data. This close comparison of the two traffic counts indicates a high degree of accuracy in the survey.

Engineers in charge of the survey, for Canton, were J. A. Shisler, city engineer; C. L. Deerwester, traffic commissioner; and L. E. Oldham, executive-secretary, Canton Postwar Planning Council. The Ohio Department of Highways was represented by C. H. Makeever, chief engineer of survey; M. A. Conner, engineer; and W. A. Martin, traffic manager.

Standards Recommended For Shovels and Cranes

A recommended commercial standard for power cranes and shovels has been submitted to producers, distributors, and users.

The purpose of this commercial standard is to provide uniform methods of supplying specification data, requirements and definitions for fair competition and a better understanding between buyers and sellers of power cranes and shovels. It covers sizes rated as to shovel dipper capacity ⅜ to 2½ cu. yd.

Proposed by the Power Crane and Shovel Association, the recommended commercial standard applies to power cranes and shovels of the convertible, full revolving types, crawler, truck and wheel mounted, including front-end operating equipment for clamshell, dragline, lifting crane, pile driver, shovel and backhoe operation.

Copies of the recommended commercial standard may be obtained from Commodities Standards Division, National Bureau of Standards, Washington 25, D. C.

What's Wrong With –

Sanitary-Sewer Design Formulas?—Conclusion

Clyde C. Kennedy • Thomas M. Niles • Joseph Rofman • S. W. Freese
Marion L. Crist • E. J. A. Gain

Editor's Note—Some of the points made in this final installment are: (1) Design of sewers for undeveloped areas is at best a gamble; (2) stormwater contributions to sanitary sewers are almost impossible to estimate; (3) groundwater infiltration, which usually increases with sewer age, is not predictable; (4) provisions must be made for future increased loads, peak flows, self-cleansing velocities and other factors; (5) municipal officials seldom approve expenditures for gaging sewer flows; and (6) extensive gagings of sewage flow may not be worth the effort expended.

Methods and formulas commonly applied for estimating sanitary–sewage flows were closely scrutinized by Richard Bennett, hydraulic engineer, City Engineer's Office, Phoenix, Ariz. in a recent article, "A Critical Appraisal of Sanitary - Sewer Design Formulas," (ENR Oct. 14, p. 102). Among other points, Mr. Bennett expressed the opinion that (1) too much dependence is placed upon textbook rules of design; (2) straight-line design formulas are used too frequently for inapplicable situations; and (3) a widespread deficiency in actual flow measurements is contributing to unrealistic sewer designs.

That this article has stimulated considerable interest as well as thought is indicated by the number of important comments that have been received from consulting, municipal and sanitary engineers. These discussions are being presented in a series of symposiums of which this is the final installment. Parts I and II of the series appeared in ENR Nov. 25, p. 76 and Dec. 23, p. 78 respectively.

Water-Sewage Ratio Is Nearly Constant

Clyde C. Kennedy
Consulting Engineer
San Francisco, Calif.

The article is an interesting review of various empirical methods for determining allowances to be made for sewage flow. A study of various methods provides ample evidence that any empirical equation or curve based on observations can be applied to a specific case only when experience and knowledge of local conditions provide the user with an appreciation of the proper factor to be applied in the instant problem.

The discussion deals with observations of conditions in Phoenix, Ariz. and other areas where the controlling conditions are similar. For that reason they are not applicable in general to other conditions which are dissimilar. In point, is the very high water use in Phoenix. The influence of high summer temperatures prevailing over the whole 24-hr. period is shown in the observed high rate of sewage flow, particularly in the higher-class residential areas. Adequate water supply has made this use possible. When water supply is restricted, sewage flow is likely to be proportionately reduced.

Many engineering offices were called upon to provide sewerage facilities for projects constructed under war emergency. In our own experience, it became necessary to measure the actual contribution of sewage from barracks, offices employing daytime employees and housing projects. Under the most favorable observed conditions, the total daily per-capita sewage flow was 54 gal. In this case, peak-flow rate was more than twice the average.

Our experience also indicates that a definite relation exists between daily water use and daily sewage flow. Based on actual measurement, dry-weather sewage flow generally ranges between 70 and 75 per cent of water use. The maximum rate of sewage flow varies with area and shape of the contributing section. Obviously the larger the area, the less flow varies from the mean. In cities of more than 100,000 population, maximum rate is approximately one-third higher than the average. In cities of less than 10,000 population, we have never observed peak flows above 150 per cent of the daily average. The above observations apply to strictly (or nearly so) domestic sewage.

Where cannery wastes must be cared for, no determination short of measurement over an extended period is of value.

Infiltration may control

In large existing systems, the problem of infiltration may become the determining factor in the design of trunk lines to which the old lines may be connected. This factor may increase sewage quantity, which must be provided, 100 per cent or more. Even the best-constructed sewer line must include a factor for infiltration. Water tightness of sewers does not increase with age.

The last stumbling block is forecasting growth and character of development in virgin areas. Probably the best that can be done is to assume certain populations as saturation under the forecast development. For conditions that we have knowledge of, the population density, for fully built cities of populations of 50,000 or less, does not exceed 18 per acre. Only special apartment-house and hotel areas go much above this. In these areas the population will be above 40 per acre and rarely above 100 per acre on a permanent resident basis.

Finally, rational design of sewers is governed by maximum-flow rate, determined both seasonally and hourly, by measurement if possible or by measurement supplemented by an estimate of increase to full development.

The choice of size is again based on judgment. We have made it a practice to include 50 percent excess capacity which provides that the sewer will, under design conditions, flow two-thirds full. Unfilled cross-section area we consider necessary to provide adequate ventilation and minimize the tendency of sewage to become septic in the sewer.

Extensive Gagings Are Unnecessary

Thomas M. Niles
Partner, Greeley and Hansen
Chicago, Ill.

Determination of sewage quantities, one of the designing engineer's most difficult tasks, involves not only competent study of available data and obtaining of additional data where needed, but also the exercise of sound engineering judgment in interpretation and application of basic data for establishment of proper bases of design.

It is fundamental that sanitary sewers should provide capacity for peak rates of sewage flow that may reasonably be expected. Sewage includes spent water supply from domestic, commercial, industrial, and perhaps other uses, groundwater infiltration, and usually some surface runoff which reaches sewers through manhole-cover openings and roof or areaway drains.

As an indication of the quantity of sewage that may be expected, sewer gagings properly analyzed in relation to the characteristics of the area served and other local conditions are useful. It is usually impossible to make complete sewer gagings throughout a system over an extended period. This is not only unnecessary but is probably not worth the effort as future development of areas served by existing sewers and to be served by new sewers will not necessarily correspond to areas gaged. Where gagings, pumping-station records, or other quantity records are available or readily obtainable, they are of great value—if intelligently used for comparable studies.

Diagrams are helpful

Diagrams or formulas properly worked out for a particular situation are useful in the design of portions of the system to which they apply. Also, it is logical that curves for cities of somewhat similar characteristics may be about the same and that there will be some degree of similarity between curves for cities of considerably different characteristics. Thus, records of flows and their variations and curves prepared for other places may be useful to the designer as a guide to judgment in arriving at proper design bases for a place where conditions may or may not be closely similar.

For convenience of computation, engineers frequently estimate yearly average quantities expected to be tributary to various points in the system, based on assumed future development and using appropriate unit quantities, per capita and per acre, for various classes of sewage. These estimated average quantities may then be multiplied by appropriate peak-flow factors to determine required sewer capacities. Such peak-flow factors should provide for variations in the rate of flow plus a capacity allowance for unforeseen developments that may contribute more sewage than has been assumed. Thus, as future populations and character and extent of future development may be estimated for large areas with more likelihood of proving to be correct than for small areas, the capacity allowance may be increased for the smaller areas. There are several ways in which such factors may be selected and applied. In general, factors will be higher for lower rates of flow and the smaller areas served. They will not be the same for all communities.

As in all engineering design where basic data may be inexact, proper design of sanitary sewers calls for application of common sense and good judgment by experienced and competent engineers, to the end that the completed system will be both functionally and economically sound.

Is Cost of Flow Gaging Justified?

Joseph Rofman
Design Engineer, Alexander Potter Associates
New York, N. Y.

The author touches upon an important phase of sewer design—maximum-design flows.

Although not extensively dealt with in the technical literature, the question of maximum-design flows, particularly in intercepting and outfall sewers, is of basic importance and receives careful engineering analysis which its importance generally warrants. There are, no doubt, cases where designs are prepared solely on the basis of minimum-flow requirements of state health authorities without consideration of possible deviations from the minimum.

A critical appraisal of such peak-flow assumptions for sewer design, currently in use, has merit of its own. For the practicing engineer, however, this is but one phase of the larger problem before him. In general, he must provide for increased future-capacity needs as well as for peak flows, self-cleansing velocities and a number of other factors. Good engineering further demands that he attain these objectives at minimum cost.

But good economy does not necessarily follow from undersized facilities.

With regard to the desirability of accurate measurements in determining peak flows in specific design problems, there can be no disagreement. The question may be raised, however, whether the expense of gaging the flow in laterals and minor truck sewers will be justified by the value of the information obtained. Such measurements are usually costly and must extend over a suitable period of time to be representative of flow conditions and to produce serviceable results.

In the case of large outfall sewers, where the data obtained from gagings has direct bearing on the design of interceptors or sewage-treatment plants, cost of flow measurements is fully justified, but such costs may not be warranted for lateral or minor trunk sewers.

Design of sewers is of necessity based on: Estimated growth of population, density of the tributary population, future per capita flow, and groundwater infiltration. Since many of these factors are matters of engineering guesswork, backed by experience; observation; and study of water consumption and population trends, the designer should provide adequate capacity "to preclude criticism resulting from operation difficulty or surcharge." At a relatively small initial increase in cost, the next larger commercial size pipe (in the 6, 8, 10, 12-in. dia. range) will provide nearly double the capacity of the smaller size, while major costs—such as cost of excavation, house connections, and restoration of pavements—remain practically the same.

Widely varying design criteria cited by the author are not, as he construes it, on a haphazard basis. On the contrary, they reflect individual judgment and adaptation of criteria to local conditions. A published chart or graph in a text book or statements in a manufacturer's bulletin, must be taken only as illustrations of cases with which the author is familiar. No matter how good, these data are not intended to supplant individual engineering judgment and experience.

To be sure, peak-flow factors, which decrease in magnitude with increasing quantities of flow, are desirable and useful where available. It may be argued, however, that the so-called "straight-line formula" are, in fact, variable factors made to apply in steps over a wider range between quantities. In a design procedure, which in itself is dependent on so many estimated variables, it is not a "factor of ignorance" but rather the "factor of prudence" that compels wide margins of safety.

The author is to be congratulated for presenting a stimulating discussion of an important factor in the field of sewer design.

Comparable Peak Flows Are Best Design Guide

S. W. Freese
Consulting Engineer
Fort Worth, Texas

It has been my experience that curves and formulas are useful as a guide in estimating domestic sewage flows. In the Fort Worth area the amount of infiltration, including any storm-water flow, is critical in design of sanitary sewers. The best guide seems to be actual measurements of peak flows in sewers under conditions comparable to those to be encountered by the new sewer. The measurements should be made in sewers in the area of the planned sewer, if possible.

The amount of infiltration is dependent on groundwater, soil, type of sewer joints and other conditions.

Direct flows of storm water into sewers depend on: Enforcement of city ordinances with reference to areaway and other drains; maintenance of sewers and repair of breaks, particularly in sewers along streams; and types of manhole covers in streets subject to flooding. None of these items are subject to analysis by formulas except possibly infiltration under uniform groundwater and sewer-construction conditions.

In planning intercepting sewers to relieve existing sewers, it is sometimes found that the amount of storm water reaching sewers during peak-flow periods is so great as to dilute sewage to the extent that it is comparable to treated effluent during normal dry-weather periods. Under such circumstances construction of relief overflows at stream crossings are often justified in preference to sewers and lift stations big enough to take peak flows.

Except for estimating domestic flows, sewage-flow formulas can be quite misleading, particularly in estimating infiltration and storm water reaching sewers.

The Phoenix, Ariz. sewer-flow data, and Mr. Richard Bennett's analysis thereof, are helpful in judging sewer problems under similar conditions.

Infiltration Is Not Predictable

Marion L. Crist
Consulting Engineer
Little Rock, Ark.

The article certainly indicates the wide range of methods used in design of sewers. The general conclusion that straight-line design formulas usually result in sewers that are too small for small areas and too large for large areas appears to be correct. Certainly the diversity factor results in less sewage flow per acre from large areas than from small.

As Mr. Bennett suggests, each locality and each community is a problem unto itself. Sewage-flow curves derived for a specific city must be considered only as generally indicative of what to expect in any specific case.

There appears to be no substitute for actual gauging of sewage flows in each design problem. Extent of the flow study should be governed by magnitude of the project involved. There are, however, certain indeterminate factors in forecasting sewage flows which cannot be definitely established by any investigations.

For example, particularly in sewers serving smaller areas, infiltration rates during and after heavy rains may amount to several times maximum dry-weather sewage flow. No matter how carefully original sewers are constructed, it is impossible to forecast accurately how much infiltration will occur in ten or fifteen years after installation of an unknown number of house connections. Future infiltration rates are dependent upon plumbing ordinances, honesty and integrity of plumbers, and conscientiousness and industry of plumbing inspectors. Since none of the factors are determinate and infiltration may be a very large factor in maximum sewage flows, no degree of present study will accurately solve the problem.

Design of sewers is not an exact science. Studies of existing sewage flows are essential and their importance should not be minimized. But in the final analysis, they are an aid to the designer's judgment in arriving at proper sizes.

Funds For Gaging Are Not Available

E. J. A. Gain
Engineer in Charge of Sewer Design
St. Louis, Mo.

Mr. Bennett does well to call attention to the general lack of data on sanitary-sewer design. Until municipal officials realize the advantage of having more complete data on sanitary-sewer flows and are willing to provide the necessary funds and skills for its collection and assembly, the possibility of adding to basic knowledge does not appear bright.

Lack of apparent necessity, discouragement of present-day high costs and insufficient personnel are facts that must be overcome before sewer-gaging projects will be approved. This applies whether the projects are carried out by municipal employees or consulting engineers employed by the community.

The article should serve as an invitation to bring forth such data as is available.

"Beam Splitter" Research May Help Aerial Mapping

Improvements in photogrammetric equipment are expected by Army Engineers who are testing a treated glass that reflects half of a beam of light and transmits the other half.

Called a beam-splitter, the device may be applied to range finders and other optical instruments that normally require the alignment of two half-images. Where the beam-splitter is used, two images of equal brightness may be brought into coincidence.

The improved beam-splitter, made to captured German formulas, has an easily controlled reflection-transmission ratio that remains constant. Light absorption is slight.

Production of the beam-splitter, as well as the tests on optical equipment, are taking place in the Engineer Research and Development Laboratories, Fort Belvoir, Virginia.

Merriman Dam is nearest completion, as New York races its growing water demand, by . . .

Building a Trio of Earthfill Dams

By visiting Downsville, Neversink and Merriman dams in the order named, one can get a step-by-step picture of each job and an overall appreciation of progress on New York City's efforts to augment its water supply from the Delaware River watershed.

Dam sites, designs and field methods are largely similar, and construction is at these successive stages:

1. Downsville. Diversion tunnel nearing completion; cofferdam under construction; trench for cutoff wall being excavated; concrete cutoff wall being built.
2. Neversink. Cutoff wall nearly completed; rolled earth embankment being placed.
3. Merriman. Earth and rock embankment being placed; effluent chamber, overflow channel and spillway weir under construction.

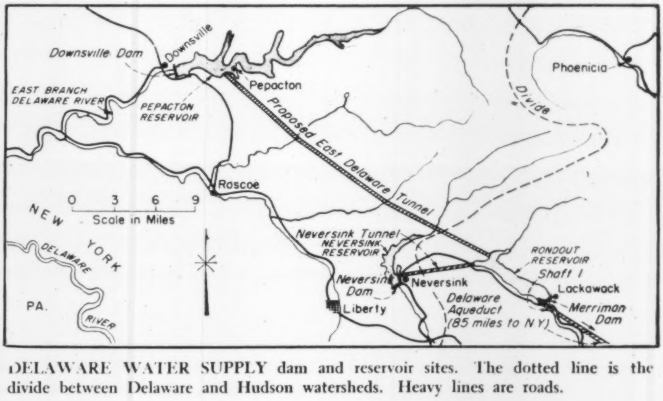
What the jobs have in common

In most respects the dams have similar overall dimensions, as the comparative table on the next page indicates. Sites are at points where valleys are narrow and regular, floored with alluvial deposits overlying bedrock at maximum depths ranging from 100 ft. at Downsville to 180 ft. at Merriman. On the valley sides, bedrock is close to the surface.

Dam construction and design features, too, are similar. Two main elements of stream diversion are a cofferdam and a diversion tunnel. The cofferdam is a cross-valley dike of compacted impervious material, laid on native subgrade and rip-rapped on the upstream side. This cofferdam becomes a part of the upstream toe of the completed dam.

The diversion tunnel extends through the rock of one abutment. At the tunnel outlet is a stilling pool whose bottom ascends in massive steps to the masonry-lined downstream channel. In operation, the outlet will be submerged.

Rock excavation performed during the diversion also includes part of the spillway works. A rectangular chamber, adjacent to the spillway weir site and directly above the diversion tunnel, is cut down from the surface. This chamber is connected downward to


Downsville Dam
Downsville
Pepacton
EAST BRANCH DELAWARE RIVER
PEPACTON RESERVOIR
Proposed East Delaware Tunnel
Phoenicia
Divide
Roscoe
0 3 6 9
Scale in Miles
NEW YORK
DELAWARE RIVER
PA.
Neversink Tunnel
NEVERSINK RESERVOIR
Neversink Dam
Neversink
Liberty
Delaware Aqueduct (85 miles to N.Y.)
RONDOUT RESERVOIR
Shaft 1
Lackawack
Merriman Dam

DELAWARE WATER SUPPLY dam and reservoir sites. The dotted line is the divide between Delaware and Hudson watersheds. Heavy lines are roads.

the tunnel by a second tunnel inclined at 45 deg.

Later, rock at the spillway weir is removed, and the weir is paved with granite masonry. At the same time an overflow channel is cut on the surface above the diversion tunnel, from the down-flow chamber to the stilling pool. As a final step, the diversion tunnel is plugged with concrete just back of the intersection of the diversion and inclined tunnels, and the downstream portion of the diversion tunnel becomes part of the spillway.

In the dam itself, a cutoff wall extending from grouted bedrock to a height generally 30 to 50 ft. above natural ground level is covered by three classes of embankment: Class A, an impervious fill, containing from 8 to 12 percent clay in the fraction less than ¼ in., moisture content of 8.1 percent (optimum) and maximum dry density of 129.2 lb. for the fine fraction; Class B, similar to (A) but with no particular degree of imperviousness specified and higher moisture content allowable (maximum 13 percent); and rock.

Class A fill in the core rises on a 10 on 3.5 slope to a 60-ft. width, 10 ft. below the top. Class B fill is on a 1 on 2.25 slope and the rockfill slope averages about 1 on 3, depending partly on the proportion of rock in the borrow. The downstream face is grassed and the upstream face is rock, with dry rubble paving in the normal draw-down zone.

Similarities in field construction

In most respects, construction procedures on all dams are the same. Tunnel drilling is done from a rail-mounted carriage, and provision is made for steel roof support where necessary. Wagon drills, with shovels for mucking, are used in open cuts. Excavation for the cutoff wall is initiated in an open cut, then, except at the abutments, completed in sheeted trench or with the aid of concrete caissons that become part of the wall.

Earth for fill is shoveled or draglined from a pit, and trucked to a processing plant, where it is scalped (maximum size in A and B fill, 5 inches) and loaded into bottom dump wagons for the dam. Classified earth is dumped in windrows on the dam, then spread in 7-in. or 8-in. loose layers for Class A and Class B, respectively, by graders and bulldozers. If its moisture content is too high, the earth is worked for evaporation by harrows of various types. Sheepsfoot rollers compact, graders shape, and smooth-wheeled rollers finish layers to 6 in. or 7 in. thickness. For drainage, lifts are placed with a 1 on 20 slope down each way from the centerline in case it rains on the tightly rolled surface.

THE DELAWARE WATER SUPPLY STORY

With a catchline of "A Billion Gallons Not Enough," *Engineering News-Record* in 1940 launched a series of 14 articles on the Delaware project, New York's latest and most significant attempt to anticipate its ever-growing water demand. The titles of those fourteen articles, listed below, indicate the extent of editorial treatment.

The project, intended to increase by more than 50 percent the present supply of one billion gallons, includes:

The deep 85-mile Delaware aqueduct between New York and Lackawack, N. Y.; three earthfill dams, Merriman, on the Hudson watershed at Lackawack, and Neversink and Downsville, both on tributaries of the Delaware River; and two tunnels, one from each reservoir on the Delaware side to Merriman reservoir.

The main aqueduct was substantially complete before World War II; it now carries the unregulated flow of Rondout Creek, which Merriman Dam will impound. Construction work on the Neversink-Rondout trans-divide tunnel got under way recently.

Dam construction, the subject of the accompanying article, is under way at all three sites. At Merriman the stream diversion, the cutoff wall and a small amount of bank fill were completed before war suspended work. Neversink prewar work included stream diversion and an exploratory cutoff-wall caisson. No prewar construction had been accomplished at Downsville. The following table, abridged from No. VIII of the prewar series, outlines dam and reservoir information:

CONTROLLING DIMENSIONS OF DAMS AND RESERVOIRS OF THE DELAWARE SYSTEM

(ENR Nov. 21, 1940, p. 692)

Reservoirs	Elevation above mean sea level (ft.) Spillway crest	Top of dam	Max. height of dam above stream-bed ft.	Approx. crest length of dam ft.	Approx. max. depth of over-burden ft.	Approx. length of reservoir miles	Available capacity mg.
Rondout (Merriman Dam)...	840	860	200	2,500	180	7.2	49,000
Neversink	1,440	1,460	200	2,700	150	5.3	36,000
E. Delaware (Downsville)...	1,280	1,300	200	2,700	100+	18.8	147,000
							232,000

Previously published articles on the Delaware project

A Billion Gallons Not Enough—Apr. 11, 1940, p. 513

Routing the Tunnel—Apr. 25, 1940, p. 584

Designing the Aqueduct—May 9, 1940, p. 656

Access to the Aqueduct—June 6, 1940, p. 797

Controlling the Flow—July 18, 1940, p. 109

Driving 85-Mi. of Tunnel—Aug. 29, 1940, p. 288

Tunnel Haulage and Hoisting—Sept. 26, 1940, p. 419

Reservoirs and Dams—Nov. 21, 1940, p. 688

Caissons for a Cutoff Wall—Dec. 5, 1940, p. 761

Treatment for Delaware Water—Dec. 19, 1940, p. 822

Passing Faults on the Aqueduct—July 31, 1941, p. 150

Concrete Core Wall at Merriman Dam—Sept. 25, 1941, p. 426

Lining the World's Longest Tunnel—Dec. 4, 1941, p. 792

Grouting Tunnel Linings—Jan. 1, 1942, p. 19

Additional protection against rain is provided by tarpaulins. These are stored on reels that may be tractor-mounted by attachment to a frame similar to that of a bulldozer.

Soils laboratory

Fill classifications are controlled in an on-the-job soils laboratory. Crews from the lab take samples from the pit and test them for gradation and moisture content. Test results determine what parts of the pit have A and B material, respectively, and when a material is dry enough for use. The contractor then works his machines where they will yield the proper materials. Because moisture requirements are more exacting in A fill, the policy is to build up A fill as rapidly as possible when moisture conditions are right.

To avoid job delays that might arise from longer standard testing procedures, the engineers use fast techniques that yield results sufficiently precise for their purposes. Three-minute quality tests are made by adding a flocculating agent, acetic acid, to a dispersed sample for the hydrometer test. One percent of these tests are checked by 150-minute straight hydrometer tests. A six-minute moisture test uses an infra-red bulb in a stove pipe for an oven, and lids from gallon cans for sample pans.

Exceptions to the rules

Despite extensive similarities among the dams, there are some differences. These differences lie principally in methods of construction, but they extend also to ultimate function. Neversink and Downsville dams, in addition to storing water for New York, will provide for release of compensation water to the Delaware River during dry periods.

Design differences pertain mostly to features whose size is affected by watershed characteristics. Thus, at Downsville the diversion tunnel is 40 ft. in diameter, 10 ft. larger than the tunnel at Merriman and 5 ft. larger than that at Neversink.

The outstanding construction difference is between the deep cutoff wall work at Downsville and that at the other two dams. At Neversink and Merriman, below the open cutoff excavation in the central portion of the dam, the contractors sank rectangular concrete caissons to bedrock, using compressed air at Merriman and free air at Neversink (ENR Dec. 5, 1940, vol. p. 761; Sept. 25, 1941, vol. p. 426).

Bedrock at Downsville is shallower than at the other dams, lying about 100 ft. below the surface. There, the contractor is going the full depth without caissons, 50 ft. maximum in sheeted trench below 50 ft. of open cut. However, he will sink one small caisson to provide an open pump well for unwatering purposes.

Sandy bedrock overburden of fair uniformity at the Neversink and Downsville sites had to be drained partially by wellpoints as open cut excavation progressed. Borrow materials at Neversink and Downsville are uniform, lying almost entirely in the A classification, so selection for the A zone at those dams will not have to be controlled as closely as at Merriman.

Other differences will appear in the individual dam discussions below. These discussions are presented in the order indicated in the first paragraph, to preserve the step-by-step approach.

Dams of the Delaware water supply system are being built by the Board of Water Supply, City of New York. John M. Fitzgerald and Victor C. Brownson are chief enigneer and deputy chief engineer, respectively. Max Freund is Watershed Department engineer, in charge of Merriman and Neversink dams. N. LeRoy Hammond is Western Department engineer, in general charge of Downsville work.

Downsville Dam • • •

Work at the Downsville damsite began in December, 1947. Included in this first contract are the diversion works and the cutoff wall. Despite severe winter weather (minimum temperature 15 deg. below zero; rain and snow 40 percent of the time) the contractor had his plant ready for full operation in the spring. Meanwhile, he began to cut the tunnel inlet.

By the end of April 1948, stripped and compacted ground in the cofferdam area was ready for fill, the first of which came from inlet channel excavation. The completed cofferdam will be 1800 ft. long and 70 ft. high, with 1 on 2 side slopes, plus an upstream weighted section. Diversion will take place in mid-1949.

Tunnel construction, featuring diesel-powered mucking in a top drift almost 30 ft. high, will be described in an early issue of ENGINEERING NEWS-RECORD. The tunnel job, however, is not the only heavy rock excavation on the job. The massive stepped-up outlet channel typical of Delaware project dams has been excavated in open cut (see illustration), as has been the inclined tunnel portion of the spillway inlet. Procedures are similar at both points, involving wagon-drilling and power-shovel mucking to diesel trucks.

Cutoff work

Hardly any groundwater was encountered in rock excavation. As might be expected, on the other hand, groundwater is an important factor in cutoff wall constraction—at least in the alluvium overlying bedrock in the dam's central portion. With a maximum depth of 100 ft. to be removed for the cutoff wall, the contractor began by excavating an open cut 50 ft. deep and 225 ft. wide at the top, narrowing to 50 ft. at the bottom. This excavation extended almost across the valley floor, omitting stream bed until completion of diversion-works. Two draglines and one shovel performed this work, loading into 13-yd. bottom-dump wagons that rolled out of the hole on a temporary earth ramp, and dumped in the down-stream toe zone.

This cut was predrained to an open sheetpile pumping well in the middle of the area. Auxiliary dewatering was by wellpoints. Twenty-foot points were jetted to position and connected to headers. Header rings were set at ten-foot elevation stages, beginning at the surface. Pumping, powered by gasoline engines, averaged 2200 g.p.m. All groundwater was chlorinated before discharge downstream. When open excavation is complete these wellpoints keep the cut dry (see illustration). The bottom two wellpoint rings are left in operation during sheeted trench excavation to bedrock.

For sheeted trench work, all low drainage is to a single permanent caisson, 20 ft. long by 10 ft. wide, sunk to the low bedrock point on the cutoff line. Except for size, this caisson is similar to those used in substantial lengths of Neversink and Merriman dam cutoff walls.

Sheeted trench work got under way in October, 1948. Steel sheetpiles are driven in lines equidistant from the

EXCAVATION for outflow stilling chamber at Downsville Dam. The diversion and spillway tunnel will emerge behind this muck pile. Atop the rock face is the initial cut for the overflow channel, which will carry emergency spillway flows. (BWS Photo)

WELLPOINTS in open excavation for the cutoff. Difference in elevation between header rings is 10 ft. All pumps are gasoline-driven and pumping has averaged about 2,200 g.p.m. throughout the work on Downsville Dam. (BWS Photo)

MOPPING UP the foundation at Neversink. A deep-well pump takes water from this 48-in. pipe well, which rises from the lowest natural earth level through impervious fill. Tile drains along the intersection of wall and natural soil conduct water to this wall. Pump discharge of about 100 g.p.m. goes to a well point system similar to that at Downsville. Existence of an electric power source nearby influenced the contractor's decision to do all pumping electrically.

centerline, mucked by clamshell and braced with structural steel sets of walers and cross braces. In the portion of the trench 30 ft. or less in depth to rock, single-stage sheeting for a 10-ft. wall is used; in deeper portions, the sheeting is placed in two stages, with the lower pile rows 10 ft. apart and the upper rows 14 ft. apart.

When bedrock is exposed, grout pipes are installed in drilled holes, and seams in the rock are sealed, whereupon the sheetpiling becomes the form for cutoff wall plain concrete. At the open cut level the wall becomes 8 ft. thick, tapering to 5 ft. at the top.

Outside the sheeted trench area, rock was exposed by light excavation, then grouted tight. Wood forms, tailored to the rock profile, received the initial concrete. Above the irregular concrete sections thus formed, and above the sheeted trench, the wall is being poured in self-raising steel sectional forms 23 ft. 3 in. by 6 ft. 8 in., backed by adjustable spreaders that permit the required taper.

These forms have movable corner posts that are raised to the succeeding lift by worm gear winches. The posts then are bolted to the concrete below, and steel panels are hoisted to their new position by the same winches.

Construction plant

Concrete is brought to the cutoff wall in mixer trucks from an on-the-job batching plant consisting of a three-compartment 100-yd. weigh-hopper and a 1400-barrel cement bin and silo.

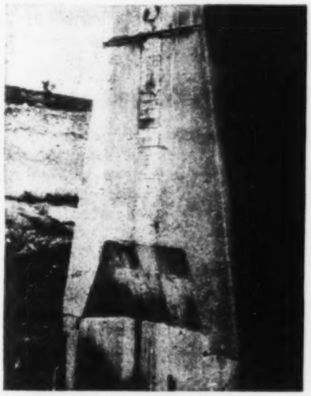
Other site facilities include a two-story demountable steel office building, two 40x100-ft. Quonset huts (one a compressor house and warehouse, the other a garage), a 48-man frame bunkhouse, a 180-seat cafeteria, a sewage-treatment plant for 400 people at 35 g.p.d. and a water supply system. Processing of the relatively small amount of earthfill needed for the cofferdam (1,200,000 cu. yd., compared with almost 7,500,000 cu. yd. in the main dam) is done on the embankment, by tractor-drawn rakes which remove oversize stones and expose as large a quantity as possible to the drying action of air and sun, before spreading in the layers that are to be rolled.

Progress on this 24-month $14,000,000 contract, which runs to November, 1949, is indicated by average monthly payments last summer of nearly $1,000,000. At the end of October, the eleventh month, the job was nearly 45 percent complete, according to late reports.

Downsville division engineer for the Board of Water Supply is B. J. Sullivan. Walsh Construction Co. and B. Perini and Sons Inc. are the associated contractors, with Jack S. Macdonald as project manager, and Jack J. Murphy as general superintendent; A. J. Allio is project engineer.

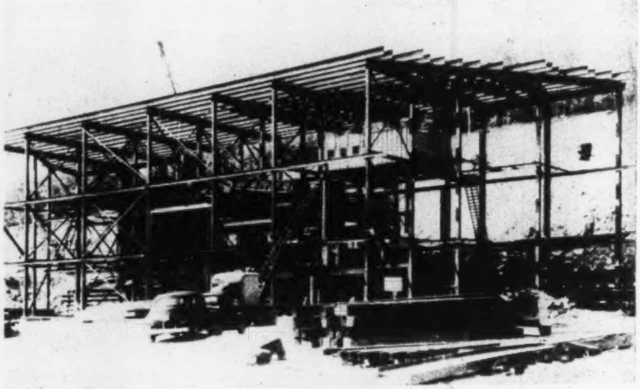
Neversink Dam • • •

Picking up almost where Downsville leaves off, the Neversink work now under way consists of placing rolled earth embankment. The whole contract is for completing the dam and spillway, but late 1948 activities were limited to preparation for full-scale filling operations, which can be conducted now that fill is complete in the confined strips on either side of the cutoff wall, within the open cut for that wall.



CUTOFF TRANSITION at Neversink between 12-ft. caisson width and 8-ft. solid wall is battered to allow more efficient machine-compaction next to the concrete

Postwar field work on the Neversink project began with cutoff wall construction. The wall contract, held by S. A. Healy, was about 80 percent complete in May, 1948, when the completion contract was awarded to the same contractor. Upon the second award, the Board of Water Supply allowed Healy to suspend wall work until earthfill rises to existing wall



SECOND GRIZZLY PLANT at Merriman. Overall plant dimensions are 230x60-ft., and the receiving deck is 60 ft. above ground at the downhill side. This grizzly subsequently was moved to Neversink dam. (BWS Photo)

heights, thus enabling cheaper and safer construction.

Another situation allows Healy to perform Neversink dam work efficiently: he holds the Merriman dam contract. Because the two dams are only 12 miles apart, equipment can be moved quickly from one job to the other. Moreover, the timing of the two contracts is in his favor. He topped-out Merriman just about the time he came out of the cut to full toe width on Neversink, so, as his Merriman working area narrowed, his Neversink area widened, and he gradually increased the amount of excavation, haulage and compaction equipment at Neversink, supplying that equipment from the waning Merriman job. In addition, some material-processing equipment was moved.

Processing plants

In preparation for increased filling at Neversink, the contractor last summer built a brand-new grizzly plant at the lower edge of the Neversink borrow pit, which is less than a half mile upstream from the dam. At the end of the season he re-erected the second Merriman grizzly (see illustration) nearby.

These two plants were designed for similar performance but they differ in the types of screens employed. The one from Merriman has two rotary scalpers 20 ft. long and 7 ft. dia., with 6-in. square holes. (It was found that on the inclined axis 6-in. holes would retain 5-in. stones.) The new plant has two 5x12-ft. shaker screens with 5-in. square holes. On each, wagons from the borrow pit drop their loads at top-deck level on parallel rail-steel bars that retain rocks over 32-in. size. Cranes equipped with rock grapples pass rejects to trucks. Grizzly power is electric.

Before the first big plant was in operation, a small screening plant in the pit produced enough material for limited initial operations. While this initial backfilling proceeded, the cut was drained partly to sumps, one on each side of the cutoff wall, and partly by the excavation wellpoint system, which was withdrawn as the fill rose. Electric dewatering power was supplemented by gasoline standby power.

The present contract also includes spillway weir, overflow channel and diversion closure. That work will begin in the 1949 working season. Final completion of the entire contract is specified for December, 1952.

Neversink division engineer for the Board of Water Supply is Frank J. Musso. J. Tierney is superintendent for Healy and J. Kearney is engineer.

Merriman . . .

As hinted above, the real 1948 earthmoving job on the Delaware dams took place at Merriman.

During the previous season the contractor had covered most of the cutoff wall in the central portion, so he had a broad unobstructed working area on which to place the remaining 3,000,000 cu. yd. of earth and 1,000,000 cu. yd. of rock-fill.

With one material-processing plant already in operation (Construction Methods, October 1947, p. 76), he stepped up his rate of material processing during the 1948 season by erecting the second plant already described. The 1947 record for material placed in two 10-hour shifts, 23,790 cu. yd. was surpassed constantly, the best daily, weekly, monthly figures for 1948 being 35,550, 186,510, and 735,000, respectively.

Two pits lie one to two miles from the dam, on the left bank. Material was loosened by light dynamite charges in holes sunk by quarry drills. Electric excavators, a 6-yd. walking dragline and five 4½- to 6-yd. shovels, as well as four smaller diesel units worked the pit.

One hundred twenty bottom-dump wagons ranging from 13- to 24-cu. yd. capacity split up the pit-to-grizzly and grizzly-to-dam assignments. Fifteen 10- to 14-cu. yd. rear-dump truck handled rock. (Rockfill work still is under way). Dam filling and compaction procedures already have been described. The dam should be ready for grassing during 1949.

Effluent chamber

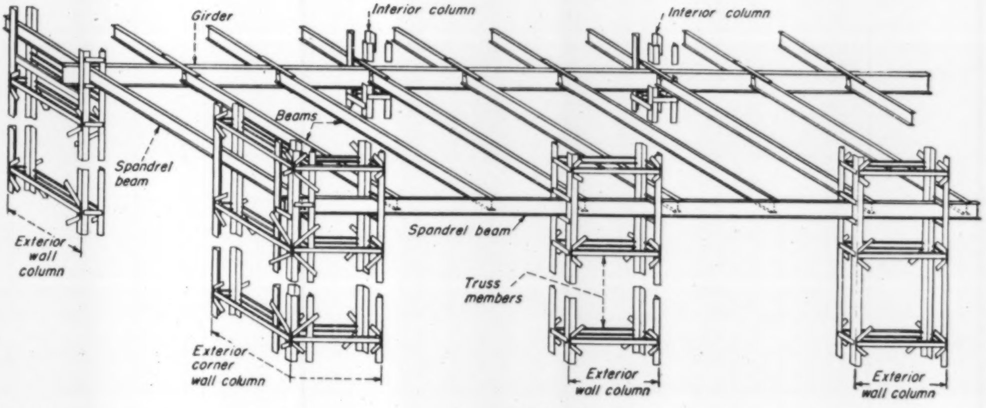
Also included in the present Merriman contract are the effluent chamber (not to be confused with the diversion tunnel inlet), spillway completion and diversion tunnel closure. All work but the last-named is under way. The Rondout effluent chamber is a few hundred feet upstream from Merriman Dam, on the right bank, and it is a short distance from Shaft 1 of the Delaware Aqueduct. Its design was described in Engineering News-Record July 18, 1940, p. 109. Concrete for the effluent chamber is mixed in a mixing plant with two 1-yd. non-tilt mixers, located on the hillside directly above the chamber. Concrete is pumped to the forms. Aggregates come from a gravel crushing and screening plant on the present stream bank above the dam.

Two stiffleg derricks standing alongside the concrete plant lower reinforcing steel, forms and metal appurtenances to the chamber. The concrete plant and the derricks are electrically powered.

The overflow channel cut, lying on the surface directly above the lower portion of the diversion tunnel, is the only significant rock excavation on the job at present. Here wagon drills sink holes for blasting, and a 2½ yd. shovel mucks the rock, loading it into rear-dump trucks that deposit their loads at the dam's downstream slope.

Air for the drilling comes from a central plant containing three 1500-c.f.m. electrically-driven compressors. This plant also powers roller doors on hoppers of the old grizzly.

George Spann is division engineer at Merriman for the Board of Water Supply. Les Lauver and K. A. Clark are superintendent and chief field engineer for the S. A. Healy Co.



Built-up columns allow girders to pass through for . . .

Continuous, All-Welded, Steel Frame

Maurice Sasso
Consulting Structural Engineer
Los Angeles, Calif.

A WELDED steel frame design recently used on two telephone equipment buildings in southern California has the advantage of simple errection, full continuity and low cost as compared to a similar riveted design.

Continuity is achieved by passing girders through columns that are built up of four steel angles tied by plates or lattice work. Stresses at midspan are controlled to any desired degree by increasing the moment of inertia of the girders near the columns by welding to the top and bottom flanges.

Engineers used this system in designing an addition to the Long Beach, Calif., office of the Associated Telephone Co.—a four-story addition superimposed on an existing two-story building.

In plan the building is 96x144 ft. Floorbeams are spaced 6½ ft. apart and columns 19½ ft. Girders are mostly 16-in. wide-flange sections weighing 36 lb. per ft. Floorbeams that span 17¾ ft. are 10-in., 25.4-lb. I-beams.

Because the original building was constructed 20 years ago, when the need for design to resist seismic forces was not apparent, adequate provisions for earthquake loads were not included.

The existing columns were, however, designed to take additional vertical loads. For this reason, horizontal forces in the new four-story section are taken in the exterior pilasters. These pilasters are carried clear to the ground on the outside of the existing building.

Basic unit in this design is a built-up column consisting of four angles joined together by tie plates, lattice bars or solid plates to form an open crate section. The column angles are spaced far enough apart to permit beams and girders to pass through them. Because of this spread, the column is capable of resisting larger vertical loads and bending moments than an H column of the same cross-sectional area because the l/r ratio is less.

Girder is continuous

Allowing the girder to be uninterrupted at and to pass through the supporting columns permits girder spans between splices of two, three, four or more bays. Length of the girders is limited only by fabricating and handling facilities, and a multispan girder thus erected is a truly continuous member. By placing the girder splices at the center of a column and making the splices fully welded, adjacent girders become in effect one continuous girder. The result is that the number of splices is decreased, positive moment resulting from vertical loads is reduced, deflection is reduced, and lateral stiffness is increased.

The girder support is made by attaching brackets to the outer face of the column legs. The bottom flange of the girder is welded to the bracket. When similar brackets are welded to the top flange of the girder and to the column, the resulting joint of column to girder may be considered completely rigid.

Such complete rigidity in interior columns is not always necessary or even advisable. In many cases the horizontal loads due to wind or earthquake forces can be resisted entirely by exterior columns. By omitting the top bracket at the interior column-girder connections, none of these horizontal forces are resisted by the interior columns. The floor acts as a diaphragm and transmits the load to the exterior columns where such top and bottom bracket connections are used.

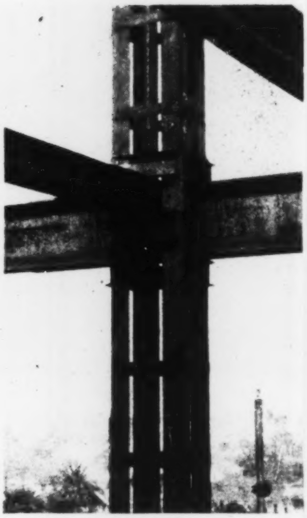
Part of the web of each beam is coped out to make the floorbeam and girder connection. This permits the upper flange of adjoining beams to fit over the upper flange of the girder and the beams become continuous by butt-welding the beam flanges. Filler plates are placed under the flanges of the beam so the rough edge of the coped-out web will not rest directly on the girder flange.

The bottom flange of the beam is welded to the girder web so that it, too, is continuous. Additional support, where necessary to resist shear, is provided by brackets welded to the girder web.

The overlap of the beam flange on the girder flange insures the safety of the joint against weld failure.

Smaller beams and girders than called for by the loading on constant-section members are used. Plates

FLANGE PLATES reinforce rolled beams and girders near the columns. The beam and girder connection in the background was made by coping out part of the beam web so the flange could fit over the girder.



BRACKETS welded to the top and bottom flange of a beam at an exterior column permit transfer of moment to the column.

welded on flanges of the girders across and past the faces of the supporting column increase the section of the girders in that part of the span. These plates, in effect, constitute a haunch. A similar built-up system is used to permit smaller floor beams.

The case of a uniformly loaded continuous beam of uniform section illustrates the advantage of such flange plates. The maximum moment is at the support and amounts to W*l*/12. However, at a distance of 0.0917 *l* from each support and at the center of span the moment is W*l*/24. Thus, a beam designed for a moment of W*l*/12 is actually more than twice as large as required for 0.8166 *l* or some four-fifths of its span length.

Thus, a fully continuous beam of constant moment of inertia is considered to be wasteful of materials. By increasing the moment of inertia where maximum moment occurs, an appreciable saving in weight can be made. The addition of flange plates increases the moment of inertia at the supports and builds up the tension and compression resistance. This design is analogous to a concrete beam with haunched ends. In the steel design, the haunch is furnished by adding a plate at the top of the flange or by adding plates at both top and bottom. By this method, any part or all of the moment at midspan can, in effect, be resisted at the end of the span.

For greatest economy it is suggested that the plates should be so chosen that, after the indeterminate moments at the ends of the haunched beam are distributed, the resulting moment at supports and at midspan produce equal fiber stress (due to bending) in the sections. If the American Institute of Steel Construction recommendations are allowed, the plates can be chosen so the stress at the support is 20 percent greater than the stress at midspan.

In designing the columns, the spacing of these ties are such that the *l*/*r* ratio of the individual column members between ties is not greater than 75 percent of the *l*/*r* ratio of the column as a whole.

These ties have a cross-sectional area capable of resisting (a) the stresses produced by a horizontal load not less than 2 percent of the gravity load and (b) the moment due to the sum of differential shears applied at the face of the column; e.g., shear due to static load, unsymmetrical loading and horizontal forces. The *l*/*r* ratio of the ties should not be greater than 60.

Columns with diagonal lacing are, in general, used where additional resistance to bending or lateral thrust is required. Resistance to seismic force is usually provided in the exterior columns and so these almost always are tied by diagonal bars. The accompanying isometric drawing illustrates this.

However, for most interior columns merely taking vertical loads, simple horizontal tie or batten plates are all that are required. The spacing of these depends on the *l*/*r* ratio of the individual angle members of the built-up columns.

Columns made of four 8x8x1⅛-in. angles are sufficient to carry the dead plus the live load required for a twelve-story office, hotel, hospital or similar type of building, with a floor panel 25x25 ft. If lightweight aggregate concrete is used in lieu of a sand-gravel aggregate a greater height can be supported.

Additional load carrying capacity in the columns can be provided by use of plates instead of battens for the lower columns. If needed and warranted, the columns can be made to carry any heavier load by substituting I or H sections for the angles in the lower stories.

Erection is simplified

This design method permits relatively simple fabrication and erection procedures. A shop organized for efficient welding processes can with ease make up the column sections. Only a few holes need be made so temporary bolts can be installed during erection.

The first column lift is delivered on the job with base plates welded on. These columns are set on the levelling plates and anchored to the foundation. Columns one story—or any number of stories—high can be delivered in a single length. If the columns are one story high, the girders are merely placed on their seats at the top of the columns. In multi-story columns an opening in two of the legs is provided so that the girder can be entered through these openings and set on the supporting brackets. Use of the multi-story columns considerably lowers the cost of shop fabrication and of field erection.

After the girders are set in the columns and temporarily bolted, then the floorbeams are set on their supporting girders. Because the top flanges of the floorbeams are supported on the girder flanges, no erection field bolts, clips and other temporary means of fastening are required. However, beams framing through the columns are temporarily bolted to maintain column spacing.

At this stage, the horizontal frame system merely rests on its supporting columns, and any adjustment in alignment is easily made at no additional cost because there are no fixed connections.

Next, four columns forming a central interior panel are plumbed and columns, girders and beams are permanently welded, thus establishing a central plumbed and rigidly connected structure. Working in all directions from this central panel, successive columns are plumbed and connections made.

No special welding sequence is believed necessary as one end of the members being welded is free. Thus, locked-up stresses or stresses due to shrinkage are eliminated.

Because this frame is different from that usually handled by erection crews, full advantage of the various possible erection economies is not always taken. On erection of two of these frames recently in southern California by two different fabricators, the crews rapidly gained erection skill. Each foreman estimated a saving of some 40 to 60 percent in time over a normal riveted design. Girders three bays long were erected in 3 min. and 10 sec. and single floorbeams in 63 sec.

Comparative bids show economy

Recently, the author had occasion to prepare and submit to fabricators for bid two different designs for a frame for the same building. The first was a standard riveted type and the second the fully continuous welded frame described in this article. Low bid on the latter was 7½ percent below the low bid for a standard riveted design. It is understood that had the fabricators been aware of all the economies that could be effected in erection procedure, a cost saving of 18 percent could have resulted.

On these comparable designs, the welded frame required 28 percent less steel by weight. This is a definite consideration when competing for steel where the demand is running ahead of the production.

Another factor in favor of the welded frame is better availability of materials. In these days of delayed delivery on many steel items, it is easier to get the angles which make up the columns than it is to get heavy rolled column sections. Available sections with flange plates can be substituted for beam and girder sections required by design and not available.

This frame design, prepared by the author, has been used recently on a telephone equipment building in Covina, Calif., for the Associated Telephone Co., Ltd., as well as the one in Long Beach, Calif., as previously described.

New Home for the Saturday Evening Post

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Accessibility, rigidity of printing-press supports and cleanliness were important considerations in the design of the first unit of a printing plant recently built for the Saturday Evening Post at Sharon, Pa., near Philadelphia.

Unobstructed access to the presses was secured by placing the columns, which are spaced 50 ft. c. to c.—in the midst of the machines. Extreme rigidity requirements, comparable to those of turbine generators, were met by using concrete-encased steel girders designed for continuity and supported on supplementary stub columns.

Interior press-room columns rest on 10-in. 42 and 53-lb. H-piles, loaded to 50 and 65 tons. These piles provide the unyielding support needed for the presses. They are driven to bedrock, which is located 10 to 30 ft. below the surface and which is overlaid by 2 ft. of disintegrated mica schist and a strata of clay, silty clay and sand.

The rest of the 242 x 1,113-ft. steel-frame structure is carried on spread footings. Floor beams around the perimeter of the press room were left without concrete encasement to provide whatever slight flexibility may be required at the walls.

The concrete first-floor slab is soil-bearing. Working areas generally have a 2½-in. wood-block finish cemented directly to the slabs.

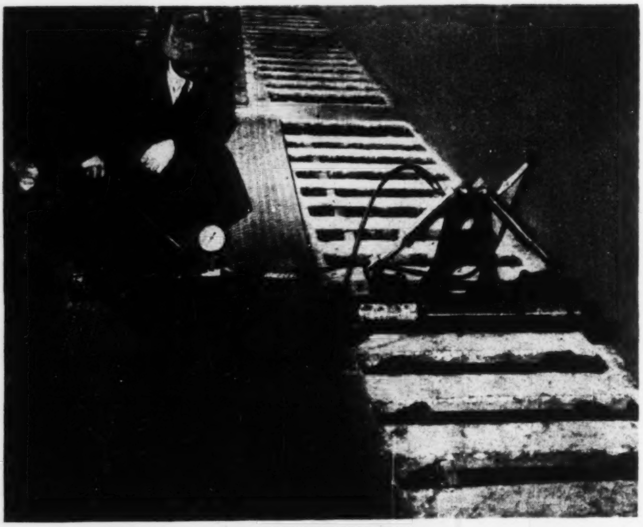
Ease of cleaning was considered essential in selecting materials for interior and exterior finish. All walls were surfaced to full height with buff-colored glazed ceramic tile. Cove bases were used throughout. The tile was protected from trucking damage by a steel-faced sloping concrete curb with round top, 15¾ in. high and projecting 10 in. Steel column guards, ¼ in. thick and 6 ft. high, were anchored into concrete backing around columns.

Precast concrete slabs were used for the flat roof, which is covered with tar and slag roofing. The press-room roof was given a second coat of tar into which slag was rolled to present a smooth surface for hosing down. Parapets extend 4.5 to 6.5 ft. to conceal the building and press ventilators.

The exterior facing is oversize, smooth, gray-specked face brick with limestone trim. No sash was provided for the humidified press and reel rooms, but glass block were used in the upper part of the press room. Continuous architectural-type steel sash extends along the bindery, the shipping room and the service bay.

A temporary rear wall was constructed with a 4 x 4-ft. grid of 2 x 4-in. wood girts, treated to resist fire and decay. These girts, supported by steel struts spaced about 16 ft. apart, carry corrugated asbestos-cement siding on the exterior face and flat asbestos-cement siding on the inside face. A sheet of aluminum foil insulation was placed in each girt panel.

Providing 644,000 sq. ft. of floor space, the building is the first unit to be built of a new printing plant for The Curtis Publishing Co. The project was under the direction of Lewis W. Trayser, vice president and director of manufacturing, The Curtis Publishing Co.; and John M. Downs, chief engineer, and Frank C. Hamilton, assistant superintendent. The writer was in charge of engineering work for Stone & Webster Engineering Corp., under the supervision of H. L. Bunce, vice president, and E. A. Dockstader, chief structural engineer. T. R. Thornburg was project manager and E. F. Stepanek construction superintendent, under L. J. Towne, vice president and construction manager.



Jointless Prestressed Floor . . . . . .

ROEBLING
TRENTON N J
TRENTON N J

. . Resists Heavy Loads in Warehouse

After 18 months of service, a jointless prestressed concrete floor, subjected to pressures estimated at 1,000 psi., shows no signs of cracking, even under microscopic examination. Although the prestressed floor costs more to build than a conventional floor with joints, the latter, it was believed, could not be depended on to remain crackless under the prevailing load concentrations and impact. The greater durability and low maintenance requirements are held to justify the added expense.

This floor was built as an experiment, preliminary to a trial adaptation of prestressed concrete to highways and airplane runways. Covering a 96 x 144-ft. area, it occupies one-third the floor space of a warehouse at Cicero, owned by John A. Roebling's Sons Co. of Illinois, whose operations include storage and distribution of wire rope.

The rope is wound on reels, which when fully loaded weigh up to 10 tons. Each reel is carried on two wooden wheels with 5-in.-wide rims, assumed for design purposes to make contact with the floor for a distance of 2 in. Hence, for a total contact area of 20 sq. in., the slab must withstand a pressure of 1,000 psi., plus impact. In comparison, the contact load for the heaviest airplanes is only 150 psi.

The reel pressures must be transmitted by the floor to a subgrade consisting mostly of foundry sand of varying depth that had been leveled and tamped with a sheepsfoot roller prior of casting the slab. Under the sand is a fill overlaying yellow clay.

To distribute the pressures to the subgrade, the 3-in. thick prestressed concrete slab was placed on a 9-in.-thick unreinforced concrete base. Made with a 1:2:3 mix, the latter was cast in alternate strips with a top elevation 3⅝ in. below the finished floor. It was topped with a patented surfacing material to obtain a smooth finish.

In addition—because the upper slab must be able to move freely on the base to make the prestressing effective—a 1/32-in. film of paraffin was coated on the upper surface of the lower slab to insure a low coefficient of friction. Over the paraffin was placed a layer of copper-coated building paper with the copper surface down. By this means, the coefficient of friction between the two slabs was kept between 0.30 and 0.38.

After the prestressing steel was fastened in place, concrete for the 3-in. slab was cast in three sections on three consecutive days. High-early-strength cement was used with varying proportions of aggregate and an admixture to assure a suitable 5,000-psi. concrete. The slab was allowed to cure in the open air, and no attempts were made to eliminate joint and shrinkage cracks, because it was anticipated that the prestressing forces would cause them to disappear—an assumption that was later verified.

The slab was prestressed in two directions. In one direction 96 ft. long, are 9/16-in., 7-wire galvanized strands having a breaking strength of 45,000 lb. each. Placed midway in the slab and spaced 14 in. on centers, these strands were sheathed in paraffin paper tubes to prevent bond with the concrete. In the perpendicular direction, 144 ft. long, are No. 6 bridge wires in two layers, 4¼ in. on centers horizontally, also placed in paper tubes to be free of bonding.

Prestressing was begun when the concrete reached a compression strength of 5,000 psi. The 7-wire strands, which had been fabricated in two pieces, were tensioned at the center of the slab (see upper photo), their outer ends being anchored by bonding in the concrete. Openings 7 x 36 in. in size

PRESTRESSING CABLES were sheathed in paper tubes to prevent bond with the concrete around them.

STRANDS were anchored by loops at the end that bonded with the concrete. Prestressing was done at the center.

WIRES in the 144-ft. direction were anchored by hooking around a pipe anchor embedded in the concrete and . . .

AT THE OPPOSITE END of the slab, these wires were prestressed by jacks acting against a steel plate.

had been left midway in the width of the floor to enable fork jacks to connect to the protruding ends of these strands. Corresponding strands from each half of the floor were pulled against each other until the concrete was stressed to about 650 psi. The strand ends were then fastened permanently by a tension assembly to maintain the precompression, and the jacks were removed.

The wires in the 144-ft. direction were anchored by bond in the concrete at one end and jacked against steel plates bearing on the concrete at the other end. When the concrete was stressed to 700 psi., nuts were placed on threaded ends of the wires and drawn tightly against the bearing plates, thereby maintaining the stress in the wires. Then the jacks were removed. All stressing points were left open for subsequent inspection and adjustment, if needed.

Observations on slab performance

After a year and a half of service, the prestressing steel was examined to determine the loss of initial stress. It was found that in the 7-wire strands, the average decrease in stress was 7½ percent and in the transverse wires 9½ percent. These losses had been accounted for in the design and in the initial stressing by conservative assumptions of the reduction in prestress.

As a result of the observations made on this experimental slab, which was constructed according to principles advanced by L. Coff, consulting engineer on the prestressing, it is claimed to have the following characteristics:

1. It will not crack until the prestress is overcome, and then if cracks should occur, they will close when the load is removed.

2. The concrete performs as if it were a homogeneous elastic material having its normal tensile strength increased by the precompression. (For a 5,000-psi. concrete with a prestress between 600 and 700 psi. in perpendicular directions, the tensile strength developed will be well over 1,000 psi. in the concrete and 600 to 700 psi. at construction joints and shrinkage cracks.) Buckling of the slab cannot take place because vertical movement is resisted by the cables, which must be stretched when such deformations occur. Thus, the length of the slab as a column is limited to the distance between contact points of prestressing steel and slab. Tests were made to verify this principle.

3. The shearing strength of the prestressed slab is great enough to resist failure due to friction forces tending to prevent horizontal movement. This friction is a function of the weight of the slab between joints, plus loads, as well as of the coefficient of friction on the base. Given the necessary prestress and a coefficient of friction near 0.35, the designers believe a jointless slab several thousand feet in length can be constructed that will move on the base without cracking.

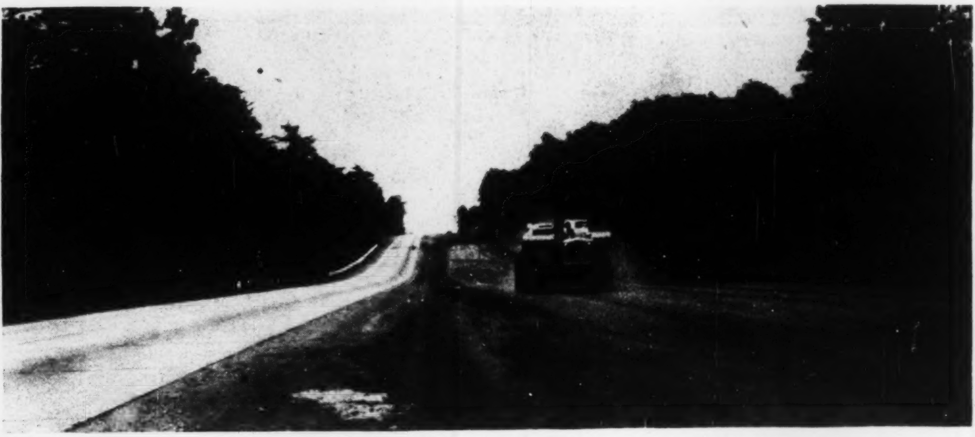
Design considerations

A factor that had to be taken into account in the design was that the warehouse interior is subjected to considerable variations in temperature and humidity. In the winter, the heating system is cut off on week-ends, with the result that a large drop in temperature may take place overnight. Humidity at times may drop to as low as 25 percent, for which value there is little data available concerning shrinkage and plastic flow in concrete. These conditions made it necessary to allow for considerable deformation of the slab due to unequal drying and unequal temperatures at top and bottom surfaces.

The stress due to live load was computed according to the Westergaard theory with the assumption that the base and prestressed slab would deflect together and the loads were apportioned to each slab accordingly. These considerations led to the selection of slab thicknesses such that theoretically the tension stresses at the bottom of the base would not cause cracks. Furthermore, it was assumed that the prestressed slab will bridge any depression or cracks in the base.

Tests were made by placing concentrated loads on a steel ring (area 63 sq. in.) in increments up to 36,000 lb. on prestressed slab atop a construction joint of the base. Deflection was 0.05 in. On removal of load, there was no permanent deflection.

The slab was designed and built under the supervision of the bridge division of John A. Roebling's Sons Co., C. C. Sunderland, chief engineer. Skidmore, Owings and Merrill were architect-engineers for the warehouse and a connecting office building, and Sumner S. Sollitt & Co. of Chicago was the general contractor.



HIGH SPEED HAUL and return makes rubber-tired earthmoving equipment pay on a modern road widening job.

Can Equipment Speed Combat Rising Earthmoving Costs?

Editor's Note—In the Oct. 28 issue we published an article "Fitting Earthmoving Equipment to the Job", in which the crawler tractor was credited with wide versatility while rubber-tired wheel machines were classified as specialized. A contrary view is presented here as respects machines on rubber tires. Ten years ago they may have been confined to particular types of work, says the author, but today they will handle "short hauls and long, good going and bad", and beat or challenge the crawler on most of them.

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Speed has almost always been industry's answer to rising material and labor prices. In the grading business, the step from the mules and road gangs of a few decades ago to the high-speed earthmoving equipment of today is no less tremendous than the strides of the radio, aviation, and automotive industries.

In the mobile equipment field, the evolution or revolution, whichever you prefer, was effected primarily by the development and use of the internal combustion engine, the articulated track, and the pneumatic tire. It is useless to speculate as to the state of the American construction industry without any one of these three. However, it is the low pressure tire that in a short 16 years of development has given wings to the scraper equipment of yesterday.

Since 1932, scrapers with increasingly bigger, lower pressures tires have utilized with increasing efficiency and economy the available tractor speed and power. Since 1938, the rubber-tired prime mover has been a leader in higher hauling speeds and lower construction costs, whether on two wheels or four. Early models were admittedly specialized, fair-weather, long-haul tools. But on good roads, at distances over 1000 ft., they proved themselves so completely that today the economic superiority of equipment of this type, under such conditions, is almost universally accepted. Where only one manufacturer offered two-wheeled prime movers in 1938, five exhibited models at the 1948 Road Show.

In the tractor field, attempts have been made to replace tracks of standard units with wheels and tires, or to "beef up" farm and industrial wheeled makes, achieving various degrees of success. These have finally resulted in a completely new four-wheel drive design to meet the demands of heavy construction work. At the Road Show last July, two manufacturers offered four models of this new dozing and pushing tool to the trade.

The question quite naturally arises as to whether or not heavy machines on rubber tires are highly specialized tools, or whether they can perform economically most of the work faced by the average general contractor. Ten years ago, the former was most certainly considered true. But ten years is a long time in terms of technical advances. Ten years ago, farmers were finding steel cleated, wheeled tractors superior to horses. Today, it is the rare exception to find the farmer who doesn't want his new tractor—and the farm wagon it pulls—mounted on rubber.

To be completely fair, it must be pointed out that methods as well as machinery have received considerable polishing. Given equipment designed for speed, contractors have developed new ways of capitalizing on it until today rubber-tired units have found a place on almost all work, short hauls and long, good going and bad. Job stories show these contractors com-

BIG LOW PRESSURE TIRES keep equipment moving even though few engineers would allow work on a job in this condition.

DESPITE DIFFICULT FOOTING, rubber-tired dozers level land for irrigated ranching at Indio, Calif., on hauls up to 300 ft.

peting with truck and shovel operations on longer hauls over good roads, and "mucking it out" with tractor scrapers on the short hauls in rough going.

For example, with one-way hauls of 200 ft. and less, Triple Cities Construction Corp., Binghamton, N. Y., moved blue gumbo, clay and quicksand in wet cuts and on steep hills, making 15 loads per machine hour to relocate Highway 16 between Chaffee and Holland, New York.

At 300 ft., J. C. O'Connor and Sons, Inc., Fort Wayne, Ind., levelled a factory site, under good conditions, at the rate of 21 loads each hour.

Building a dike for Queens Lane Reservoir at Philadelphia, Augustine Construction Co., moved dirt, rooted rock, mica, sand and clay up grades to 17 percent in snow, rain, and sleet at the rate of 17 loads per hr. on one-way hauls of 600 ft.

For what is probably an all-time record, Elmer Anderson, regrading county roads south of Alberta, Minn., moved 42 loads per hour with each machine on a 400 ft. round trip.

B. G. Young and Sons, Johnson City, Tenn., moved 15 loads per machine hour over 6 percent grades and one-way hauls of 700 ft. on the Greeneville, Tenn., airport.

Working tough blow-sand cuts and with hauls of 2,500 ft., for a new Wisconsin-Minnesota bridge approach on U. S. 12 near Hudson, Wis., John O'Keefe delivered 10 loads to the fill each hour with each of his rubber tired units.

Basically, these stories and hundreds of others like them stem from the fact that the contractor who purchased rubber-tired equipment was not content to consider his investment as a one-shot proposition for special jobs. At the same time, manufacturers pioneered bigger lower-pressure tires than before, mounted on tapered bead rims. Coupled with power steering and more positive drive, these new developments gave the contractor not only speed, but the ability to keep the dirt moving in almost any kind of footing.

How specialty concept changed

An analysis of the characteristics of the rubber tired prime mover and scraper serves to show how the original specialized concept of manufacturers was wrong.

From the first, the rubber tired prime mover was designed for high average speed under off-the-road conditions rather than high top speed. Power to accelerate rapidly and haul big loads, where highway equipment was not suitable, was incorporated.

Power to load was purposely missing. Loading being a relatively short portion of the complete cycle, it was considered impractical to incorporate sufficient power for this operation, and to have this power idle a large percentage of the time. Instead, the concept of pusher loading came into prominence in which a pusher tractor with a fleet of two or more scraper units kept all available power working to capacity in the same manner as a properly balanced shovel and truck operation.

Thus, what appeared superficially as a design weakness was actually a point of strength. Many tractor-scraper operators had already discovered the economics of this principal with the result that bigger and bigger scrapers were appearing for the same tractor. The limiting factor was the weight the tractor could haul, not what it could load without assistance. Without additional speed, a tractor could only step up production by hauling more each trip, and contractors found it paid off.

Here's how the method works out. A tractor capable of loading 8 to 9 cu. yd. of typical tough clay subsoil is quite often capable of pulling a 23 cu. yd. unit with almost twice the pay load although it may take two such tractors to load the latter. Then a production comparison might well show:

	15 Yd. Scraper	23 Yd. Scraper
Pay load is.............	8.5 cu.yd.	16 cu.yd.
On a 500 ft. haul at 5.5 to 6.0 mph. (500 fpm), haul and return time is.......	2.0 min.	2.0 min.
Load, spread, etc.........	3.0 min.	3.0 min.
	—	—
Total cycle is...........	5.0 min.	5.0 min.
Trips per 50-min. hour (83% job efficiency)...	10	10
Pay yards per hr........	85	160

Production alone, however, is not the whole answer since the first cost of the larger unit is higher, and the cost of a pusher tractor must also be considered.

Approximate hourly ownership and

operating costs of the units involved are as follows:

	15 Cu. Yd. Scraper	23 Cu. Yd. Scraper
Tractor and scraper combination	$8.00	$10.00
Pusher tractor	.....	6.50

To make full use of the pusher tractor, three scraper units are required. The five-minute cycles allow one minute for loading each unit and one-half minute for making contact with the next with a small margin to spare. Then yardage costs become:

For the 15 yd. unit, $8.00 divided by 85 cu. yd. = 9.4c. per cu. yd.

For the 23 yd. unit, ($10.00 plus ⅓ pusher cost of 6.50) divided by 160 cu. yd. = 12.18 ÷ 160 = 7.6c. per cu. yd.

Adding B. G. Young and Sons rubber tired units to our comparison shows that these units are also seriously competitive:

On a 700 ft. haul, loads per hour were........15

Under the same clay conditions with the same pusher plus the power of the rubber tired prime mover, an average load would be......9 cu. yd.

Then pay yards per hour are..............135

Approximate owning and operating costs per hour of this unit are.........................$8.18

With faster cycles, one pusher cannot handle more than two scraper units so one-half the cost must be prorated in this case............$3.25

Yardage costs become $11.43 ÷ 135 =.... 8.5c.

If a motor patrol is necessary to keep haul roads in shape for fast cycles, adding half a high estimated hourly cost of $6.00 for this machine would give costs equal to: $14.43 ÷ 135 = 10.7c. per cu. yd.

However, common sense would tell us that one patrol can maintain the road for four units as easily as two, and increasing our fleet to four cuts the costs thus:

Rubber-tired scraper and prime mover..	$8.18
½ pusher @ $6.50..................	3.25
¼ motor patrol at $6.00..............	1.50
TOTAL	$12.93

12.93 ÷ 135 = 9.6c. per cu. yd.

From this example, it is indicated that ordinary scraper operation is a standoff, and that big tractor scrapers on extremely short hauls may, by using a method often described as a rubber-tired power weakness, find some small cost advantage. A million yards on this job would multiply this saving to $20,000. All three are close enough, however, especially since the rubber tired haul was 700 ft. against 500 ft. for tractors, that changes in materials, conditions, operating skill, job layout and supervision could make either one temporarily superior.

The real point to be realized is that mere shortness of haul is not the finally deciding factor. The medium and long haul rubber-tired unit can be and often is a serious and successful contender on short haul work. Costs in these comparisons contain only such charges as can be applied directly to ownership and operation of the machines and do not even closely approximate contractor's bid figures which must include such items as supervision, overhead, contingencies and profit.

STEEP GRADE, SOFT GOING are negotiated by rubber tired equipment in hauling iron ore at Cartersville, Ga.

Short hauls, soft-going comparison

This comparison has covered what could be considered a more or less average setup. How does the picture change when the going gets rough? Using the same equipment groupings, let us propose soft going which involves rolling resistances of 350 lb. per gross ton of equipment weight, 3,000-lb material, and a coefficient of tractive efficiency for rubber tires as low as 35 percent.

Fixed time, or time required to load, spread, turn and accelerate has, on the average, been considered to be 3.0 min. for scrapers of over 14 cu. yd. heaped, and 2.5 min. for scrapers under 14 cu. yd. heaped. Developments in both new rubber and track equipment are lowering these figures, but since experience is not yet sufficient to set up a lower average and since we are interested primarily in a comparison, these fixed times will suffice.

Table I shows that poor under-foot conditions can cut hauling and return speeds of rubber tired equipment in half or even more, but that they also seriously impede the travel of tracked units. Of course, there have always been places where the break-over point is reached. Then, although slowed to a crawl, tractor units may work where rubber will not even go.

In present day earthwork, however, the percentage grows increasingly smaller. First, the workability of rubber tired units has improved tremendously. Secondly, on dams, roads, airports, and most jobs, where earth is a construction material and not a waste product, work is governed not so much by ability of equipment to go under extremely adverse conditions as by acceptability of material to build

TABLE I—COST COMPARISON FOR SCRAPERS ON SHORT HAUL, SOFT GOING

	Tractor and 15 Cu. Yd. Scraper	Tractor and 23 Cu. Yd. Scraper	13.5 Cu. Yd. Scraper with Rubber Tired Prime Mover
Fixed time	3.0 min.	3.0 min.	2.5 min.
Haul 500 ft	1.8	2.5	1.3
Return 500 ft	1.5	1.8	0.7
Total cycle	6.3 min.	7.3 min.	4.5 min.
Trips per 50-min. hour (83% job efficiency)	7.9	6.8	11.1
Pay yards per load (From previous comparison)	8.5	16	
Pay yards per hr	67.2	108.8	99.9
Machine cost per hour	$8.00	$10.00	$8.18
Pusher costs prorated		(¼) 1.62	(⅓) 2.18
Total hourly cost	$8.00	$11.62	$10.36
Cost per yard	11.9c.	10.7c.	10.3c.

stable, compacted fills. Present compaction specifications with close moisture control probably shut down far more jobs than the inability of equipment to work.

Small job considerations

The most serious weakness of the rubber tired prime mover and scraper has always been its inability to work economically as a single unit. Small jobs of only a few days duration do not justify the moving expense of any quantity of equipment. Then, even though hauls may exceed those normally considered within tractor range, it is often cheaper to move in a single self-contained earthmover. Even here, however, it can not be said that the tractor scraper is secure in the field. Smaller rubber tired machines through trial and adaptation have resulted in several which will load adequately without help in average materials and conditions. An added feature is their ability to move over paved surfaces, through traffic, at relatively high speeds under their own power. Loading, unloading and trucking costs are eliminated. With the development of these smaller self contained machines, the rubber tired scraper unit has become capable of performing at "lowest net cost per yard" most of the earthwork of the average contractor. Considering his all-around hauling equipment needs today, it is a highly specialized earthmoving contractor who can afford to overlook the possibilities of rubber.

In the tractor dozer field, rubber tired power has also taken considerable strides, although its inception was much later, and job evidence is not nearly so complete. The four-wheel-drive, high-speed dozer has put the action in traction. It is difficult to compare such a machine adequately with track laying types. Generally speaking, pound for pound, it does not deliver as high a draw bar pull or push. Where track grousers make possible draw bar pulls as high as 80 percent of the tractor weight, tire tread and friction will probably seldom deliver an average higher than 60 percent. Where track pads will float a crawler unit over ground with bearing values of 8 to 12 psi., the lowest tire pressures now available require a minimum supporting value of 15 to 20 psi.

Against these seeming deficiencies is a tremendous credit value in speed and mobility. The word "seeming" is used because although traction and flotation do not actually compare pound for pound, they have been found adequate for most work. These same comparisons were once made between pull graders and motor patrols. Today, however, the motor patrol is the accepted finishing tool. The speed and traction of its rubber tired power are considered superior rather than lacking in any respect.

For a proper evaluation of tractor power, neither drawbar pull nor speed can be considered separately. Some work, of course, depends on simple brute force, some on high operating speed. Most however, falls into an inseparable combination of the two. Then, having introduced sufficient force to overcome a given load, the faster an operation can be done, the more work can be accomplished.

There is perhaps a ten percent fringe of jobs handled by dozers where a rubber tired dozer, regardless of size, will not work because of traction or flotation difficulties. Rubber tired machines have proven their ability to work under rough and difficult going, however, and are finding acceptance in most of the field of dozer work. Take a look at one of the cost common, a straight dozing job, illustrated in Table II.

TABLE II—COST COMPARISON ON BULLDOZING OPERATION

	Rubber Tired Dozer	Track Type Dozer
Haul distance: 100 ft.		
Material: clay subsoil		
Doze 100 ft., assuming no speed advantage although this is often possible	.66 min.	.66 min.
Return 100 ft	.17 min.	.33 min.
Load, blade and change direction twice	.3	.5
Total cycle	1.13 min.	1.49 min.
Trips per 50-min. hr	44.2	33.6
Estimated pay yards per load	2.0	2.0
Pay yards per hr	88.4	67.2
Dozing in 2nd gear, however, takes not .66 minute but	.39 min.	
Then total cycle is	.86	
Trips per 50-min. hr. become	58.2	
And pay yards per hr. equals	116.4	

On another typical assignment—push-loading high speed hauling units—if we substitute a loading time of one minute in the comparison for dozing time and if the cycle for the scraper units is six minutes:

	Rubber Tired Dozer	Tracked Type Dozer
Pusher cycle is	1.47 min.	1.85 min.
Number of scrapers each can handle	4	3

One of the most striking advantages of speed occurs on the scatter jobs attendant to large operations where the savings in travel time from point to point can often build to sizeable proportions. Low pressure tires and speeds up to 15 mph take these units anywhere in a hurry.

Earthmoving experience

A cross section of a few jobs indicates the ability of such units not only in tough going but on projects where speed is a real factor. Working in wet clay and gumbo, a rubber tired dozer licked tough going on levee work for the Mississippi highway department along Highway 7 between Greenwood and Granada. Sometimes the dozer was buried to the under carriage, but climbing out under its own power went right on working. On a high output job, contractor Sam Falbo at Lorain, Ohio, working 24 hr. a day, 7 days a week stockpiling coal for an Ohio steel mill, averaged 116 cu. yd. per hour on 300 ft round-trip dozing cycles.

In Texas, two units building a small earth dam and stockpond cut and drifted loads in second gear, backed in third at 7 mph, averaged 64 cycles each per hour on a round trip haul of 250 ft. Material handled varied from hard red clay to muck.

As a pusher tool on Elmer Anderson's Minnesota road job, another unit was a big factor in high output of rubber tired prime movers and scrapers. Pushloading 13.5 cu. yd. units to a heap load in second gear, it loaded scrapers in 36 sec., boosted 84 loads per hr. out of the cut.

Performance records of this kind are rapidly extending rubber tired dozer acceptance. The basic reasoning is this:

1. Traction and flotation sufficient for most work.
2. Speed and mobility to increase production, cut non-productive moving time.
3. Ability to travel anywhere over paved areas without damage to the pavement.

This is the story behind rubber tired dozer and prime-mover-scraper development. These are the wings that rubber has given to earthmoving. It is not intended to represent rubber tired power as the only method nor as always the best method, but only to indicate to some small extent what the factor of speed can mean. If construction costs are to remain in sight while labor and materials climb, machinery which makes it possible for each man and every dollar invested to do more work is necessary. The speed and versatility of rubber tired power is a step in that direction.

Notes on Legal Decisions

Summaries of decisions relating to construction prepared by I. Vernon Werbin, counselor at law and engineer, New York

Owner's Interference With Work

It is well settled that where the owner interferes with the contractor's work, and such active interference causes damage to the contractor, the contractor may recover the same from the owner[1]. Where the owner prevents or interferes with performance by the contractor, the latter is entitled to recover the damage sustained by him as a result of such act[1]. Even in the absence of an express covenant, there is an implied one that contractor shall be permitted to proceed in accordance with the contract and that he shall be given possession of the premises to enable him to perform the work.

To amount to a prevention of performance the conduct must be wrongful and in excess of the owner's legal rights. Threats do not make performance impossible, and cannot be treated as discharging the contract. The mere fact that permitted conduct of this nature by one promisor renders unpleasant or inconvenient performance by the other of his agreement effects no discharge of that obligation[2].

(1) American Bridge Co., Inc. v. State, 245 App. Div. 535, 283 N. Y. Suppl. 577.
(2) Li Volsi Const. Co. v. Shepard, et al., 48 A. 2d, 263.

Contracts With Municipalities

As a general rule there can be no recovery for services rendered to a municipal corporation in the absence of an appropriation with which to pay for the said service[1]. In New York City the Administrative Code provides: "It shall be unlawful for any agency to incur any expense unless an appropriation shall have been previously made covering such expense."

It is undisputed that a municipality cannot be made liable for breach of contract, or services rendered, or sales price, or even for use and occupancy of property acquired, where an official of the municipality has exceeded his power or authority[2]. And it is fundamental that one dealing with the agents of the state or a municipal corporation is chargeable with notice of the limitations of their power and authority[3]. Public officers are merely officers of the public, whose powers and authority are defined and limited by law. Any act without the scope of the authority so defined does not bind the principal. All persons dealing with such agents are charged with knowledge of the extent of their authority[4].

(1) Brooklyn Citizen v. City of New York, 14 N.Y.S. 2nd. 515, 171 Misc. 1035.
(2) Lindlots Realty Corp. v. Suffolk County, 278 N.Y. 451, 15 N.E. 2d. 393.
(3) Starling Realty Corporation v. State, 20 N.Y.S. 2d, 878, 174 Misc. 375.
(4) Northern Pacific Ry. Co. v. United States, 70 F. Supp. 836.

Plans Exceeding Estimates

An architect employed to prepare plans and specifications for a building to cost a specific sum, cannot recover compensation for his services where the building cannot be erected except at a cost materially in excess of the amount specified[1]. Relief may be granted if the increased cost is due to special circumstances or to a change of plans made by the direction of the owner. Where an architect submits estimate of the probable cost of the building, he cannot recover for his plans unless the estimate is reasonably near the actual cost[2].

Where the architect merely gives an "offhand" estimate of the probable cost of erecting a building, he is not liable for any excess of the actual cost of erecting the building over the estimated cost[3].

(1) Andry & Feitel v. Ewing, 130 So. 570.
(2) Capitol Hotel Co. v. Rittenberry, 412 S.W. 2d, 697.
(3) Bodine v. Andrews, 47 App. Div. 495, 62 N.Y.S. 385.

Accepting Defective Work

Where work has been inadequately performed and the defects are of such a character that the other party can be charged with knowledge of them, acceptance of the work without protest will usually be considered as a waiver of defective performance[1].

The mere occupancy and use of a building does not of itself constitute a waiver of defective performance. In many cases the owner is by circumstances forced to take possession. What constitutes the waiver is a question of fact to be determined by all the circumstances of the case[2].

By acceptance and occupancy of a building, the owner does not waive his right to damages for latent defects that could not have been discovered at the time of the acceptance of the work[3]. It may often happen that a building contains defects that the owner could not reasonably be expected to discover at the time the building was accepted. For instance the materials used may have been of inferior quality, or the work may have been so poorly performed as to render the building of little use to the owner. In such a case the owner is entitled to assert his claim for damages within a reasonable time after he had an opportunity to discover the defects in question[4].

(1) Kirkpatrick v. McMillan, 49 N.M. 100, 157 P. 2d 772.
(2) Hanley v. Walker, 79 Mich. 607, 45 N.W. 57.
(3) DiFranco v. Ascani, 127 So. 76.
(4) Eckhardt v. Harder et al., 294 P. 981.

Equipment Rental

The rental value of equipment kept idle during a period of a stop order[1], or by reason of delays caused by the owner is a proper element of damages. The measure of damages is the fair and reasonable rental value of the equipment used[2].

Damage has been allowed in cases where the equipment was owned by the contractor and it was shown that during the period of the delay there was "a fertile field for the rental of the machinery in the immediate area of operations"[3].

(1) Brand Investment Co. v. United States, 102 Ct. Cl. 40.
(2) Lowman Const. Corp. v. State, 10 N.Y.S. 2d, 963.
(3) Town and Country Engineering Corp. v. State, 46 N.Y.S. 2d, 792.

Contingent Compensation

Contracts of employment that involve procurement of public contracts, where compensation is contingent upon success, have generally been held to be against public policy and unenforceable. The theory is that where payment is contingent upon success there is a tendency to exert improper influences to effect the successful procurement of the contract. It is immaterial whether improper means are contemplated or actually used in obtaining the contract. However, an exception is generally made where the person employed to obtain the contract is regularly engaged as a broker[1]. This is the rule universally applied to the procurement of government contracts[2].

In many jurisdictions, however, where no improper influences are contemplated or used, an agreement whereby one is employed to obtain a public contract is valid and enforceable. The fact that compensation is contingent on success is not conclusive evidence that improper means will be used to secure the desired result[3].

(1) Bradley v. American Radiator & Standard Sanitary Corp., 6 F.R.D. 37.
(2) O'Connor v. Hudson River Day Line, 269 Appl. Div. 960, 58 N.Y.S. 2d, 175.
(3) Stone, et al., v. Williams Steinen Mfg. Co., 39 A. 2d, 241.

Satisfying the Owner

A contract provision that the work shall be done to the satisfaction of the owner or architect merely means that the work shall be performed in such a manner as would be satisfactory to a reasonable person[1].

The words of a contract "to the entire satisfaction of owner" import that the construction shall be to the satisfaction of a reasonable man and not to the owner's personal satisfaction[2].

(1) Fielding & Shepley, Inc v. Dow, 163 P. 2nd. 908. Scott Co. v. Rolkin, et al., 23 P. 2nd. 1065.
(2) MacDonald v. Kavanaugh, 156 N.E. 740.

Oral vs. Written Evidence

The general rule is that before evidence will be admitted to show an oral agreement to vary the terms of a written contract, at least three conditions must exist:

(1) The agreement must in form be a collateral one.

(2) It must not contradict express or implied provisions of the written contract.

(3) It must be one that the parties would not ordinarily be expected to embody in the writing.[1]

Oral evidence is admissible to show that a written contract was not to take effect until the occurrence of some future event.[2]

(1) Mitchell v. Lath, 247 N. Y., 372.
(2) English v. Hetherington & Berner, 71 F (2d) 613.

Stated Maximum Cost

Where the contractor guarantees that the actual cost of the work will not exceed a fixed sum the contractor cannot recover the cost of the work in excess of such amount. This is especially true where the contract provides that the amount to be paid by the owner shall in no event exceed the amount set forth in the contract and that the contractor agrees that the cost will not exceed such fixed sum[1].

(1) Wuellner, et al. v. Illinois Bell Telephone Co., 54 N.E. 2d, 853, affirmed 60 N.E. 2d, 867.

Contractor Facilitates Work

It is the duty of a party for whom another is doing work to do his or its part to facilitate the performance of the work[1]. The failure or refusal to do so not only dispenses with the obligation of performance but also entitles the other party to the contract to rescind it. Where rescission will not afford an adequate remedy, the party may proceed with performance and recover such damages as the delinquency has occasioned[2].

(1) Wilson & English Const. Co. v. New York Central R.R. Co., 240 App. Div. 479; 269 N. Y. Suppl., 874.
(2) Mansfield v. New York Central & H. R. R. Co., 102 N. Y. 205.

Aeration of Flax Retting Liquids Prevents Stream Pollution

Aeration of flax retting liquids during retting not only permits re-use of the liquid throughout the processing season but also reduces pollution by permitting storage and gradual discharge to streams. Retting is defined as soaking of flax in water to rot soft tissues and loosen fibers.

This new process, which has been developed by the Water Pollution Research Laboratory, Department of Scientific and Industrial Research, London, England, is described in "Water Pollution Research Technical Paper No. 10—Flax Retting With Aeration."

Up to 1940, flax factories in Great Britain did not produce retted flax but employed the process of "green scutching," by which fiber is separated from flax without retting. Green scrutching produces a relatively coarse fiber which is unsuitable for many purposes. To produce fiber of fine quality it is necessary to ret the flax.

Much of England's supply of retted flax was obtained from the Continent, particularly from Belgium. When the continental sources of supply were lost in 1940, it was decided to install retting tanks at English flax factories.

The anaerobic process of retting, which was used on the Continent, produces large quantities of highly polluting waste water. Many of the English factories were so placed that there was neither suitable streams nor sewage-disposal works to which the waste could be discharged.

The Water Pollution Research Laboratory, Department of Scientific and Industrial Research, was asked by the Ministry of Supply to investigate this problem. Technical Paper No. 10 gives an account of the investigation, of which the final stage was the development of a new process in which the retting liquid is aerated during retting by passing through it a stream of small air bubbles. The treatment permits the water to be reused in successive rets throughout a season.

At the end of the season a small quantity of waste water then presents no serious disposal problem. It can be stored and disposed of gradually on land or by discharge to a stream.

Plants operating by this process have been installed at a number of flax factories. An account is given of the first season's operation at five of these plants. Design of the waste-treatment plant is also described.

Work which led up to the development of the new process is described in detail in the report. It included attempts to treat waste liquor from anaerobic retting by chemicals as well as biological filtration. Treatment by coagulation with chemicals did not produce an effluent suitable for discharge to an inland stream. Biological filtration produced a good effluent but cost of plant and area of land required would be considerable. Operation of percolating filters would be difficult as retting is not continuous.

Efforts were then made to find a process which would produce an effluent good enough for re-use in the process though not necessarily good enough for discharge to a stream. Small-scale experiments were made on retting with recirculation of liquor through a percolating filter, with recirculation through an aeration tank, and with aeration of the liquor in the retting tank. The last process, tested in semi-scale and full-scale plants, was finally adopted in practice.

Bacteriological examinations were made of retting liquor and flax during retting. It was found that, when the liquor was aerated, bacterial growth resulted largely in oxidization of organic matter instead of conversion to acids, as in the anaerobic process. Conditions in the flax stems themselves, however, were still anaerobic and the organisms mainly responsible for retting, even under considerable areation, were found to be spore-forming anaerobes.

Technical Paper No. 10 may be obtained from His Majesty's Stationery Office, London, England, at a cost of $1.00.

There's No Mystery in Weir-Flow Calculations

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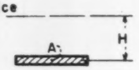
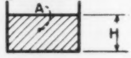
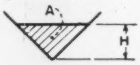
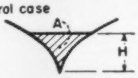
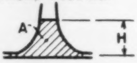
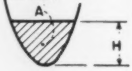
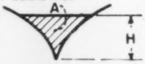
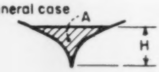
THE BASIC CONCEPT that discharge over a plate weir is a simple function of area, head and shape of notch is too often obscured by algebraics and dimensional analysis.

Suddenly called upon to measure a flow of water on the job, an engineer is often caught between too much complexity in textbooks and too few useful coefficients in handbooks. He can look at the notch and observe its shape; he can determine the weir profile and calculate the area below headwater-pool level; and he can measure the head above the crest. He may sense that these factors are related to discharge, but the question, "How much water?"—even within four or five percent—is likely to be met with a blank look or forbidding formulas.

Basic approach cited

Weir-flow calculations should not be shrouded in such mystery. That they can be simplified and made readily usable with the aid of graphs is shown by the following analysis:

TABLE I ANALYSIS OF FREE DISCHARGE COEFFICIENTS

Shape of notch	Shape factor $m = \frac{\Delta \log A}{\Delta \log H}$	Coefficient $\frac{C}{\mu\sqrt{2g}}$
(a) Orifice 	0	$1 = \left[\frac{0!}{1!} = \frac{(2m)!}{(2m+1)!}\right]$
(b) Rectangular weir 	1	$\frac{2}{3} = \frac{2}{3}$
(c) Triangular V-notch weir 	2	$\frac{8}{15} = \frac{2\cdot4}{3\cdot5}$
(d) General case 	m (IF 2m is even)	$\frac{C}{\mu\sqrt{2g}} = \frac{2\cdot4\cdot6\cdots(2m)}{3\cdot5\cdot7\cdots(2m+1)}$
(e) Proportional head weir 	0.5	$\frac{\pi}{2}\cdot\frac{1}{2}$
(f) Parabolic weir 	1.5	$\frac{\pi}{2}\cdot\frac{1\cdot3}{2\cdot4}$
(g) Semi-cubic weir 	2.5	$\frac{\pi}{2}\cdot\frac{1\cdot3\cdot5}{2\cdot4\cdot6}$
(h) General case 	m (IF 2m is odd)	$\frac{C}{\mu\sqrt{2g}} = \frac{\pi}{2}\cdot\frac{(2m)!}{(2m+1)!}$

Equations for flow of water over weirs usually express rate of discharge, Q, as a function of head on the crest, H, but each weir shape requires a particular formula. Theoretical discharge through an orifice flowing full follows the equation

$Q = \mu A\sqrt{2gH}$ in which

μ = a dimensionless coefficient of the order of 0.60 for sharp-crested orifices;
A = area of opening, sq. ft.; and
g = acceleration of gravity, 32.2 ft. per sec. per sec.

In the rational analysis of free discharge through an orifice or weir, the area of opening below headwater-pool level is assumed to be subdivided into thin strips whose respective increments of area, ΔA_i, discharge water with an average velocity of $\sqrt{2gH_i}$. This assumption leads to the theoretical expression

$$Q = \mu\sqrt{2g}\,\Sigma\Delta A_i\sqrt{H_i}.$$

From this perspective, orifice and weir formulas might be expected to comprise an orderly family of equations of the general form

$Q = CA\sqrt{H}$ in which

C = a discharge coefficient depending only on "shape factor" of the weir remaining after head on weir and area of notch below headwater pool have been explicitly evaluated in the computation.

Rectangular and V-notch weir formulas

In the following analysis of coefficients for rectangular and V-notch weirs, velocity of approach is assumed to be negligible.

For a rectangular weir with a crest length, b, and head, H, the area of segment of notch below headwater pool, $A = b \times H$ (1)

The discharge,

$$Q = \frac{2}{3}\mu\sqrt{2g}\,bH^{1.5} \qquad (2)$$

By combining equations (1) and (2), it follows that

$$Q = \frac{2}{3}\mu\sqrt{2g}\,A\sqrt{H}$$

$$C\ (\text{rectangle}) = \mu\sqrt{2g}\,\frac{2}{3}. \qquad (3)$$

Similarly, for a V-notch or triangular weir, the area below level of headwater pool, $A = \left(\frac{b}{H}\right)\frac{H^2}{2}$ (4)

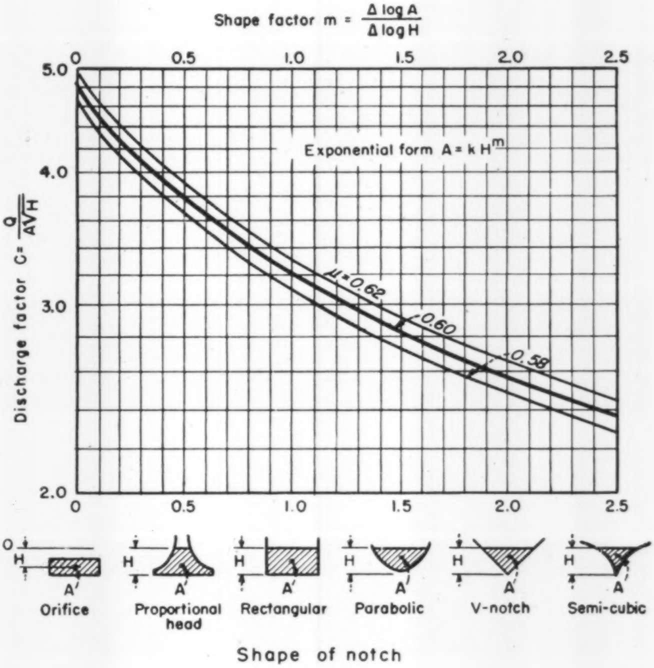
and discharge,

$$Q = \mu\sqrt{2g}\left(\frac{4}{15}\right)\left(\frac{b}{H}\right)H^{2.5} \qquad (5)$$

in which b is width of notch at level of headwater pool. Clearing terms as before

$$Q = \mu\sqrt{2g}\left(\frac{8}{15}\right)A\sqrt{H}$$

$$C\ (\text{triangle}) = \mu\sqrt{2g}\left(\frac{8}{15}\right). \qquad (6)$$



$$C = \mu\sqrt{2g}\,\frac{\pi}{2}\left[\frac{1\times3\times5\cdots(2m)}{2\times4\times6\cdots(2m+1)}\right] \text{ if } \underline{2m} \text{ is } \underline{\text{odd}}$$

$$C = \mu\sqrt{2g}\left[\frac{2\times4\times6\cdots(2m)}{3\times5\times7\cdots(2m+1)}\right] \text{ if } \underline{2m} \text{ is } \underline{\text{even}}$$

Fig. 1. Discharge factors for notches of simple exponential form $A = k\ H^m$.

TYPICAL COMPUTATIONS

Example 1— Water flows through a parabolic weir under a head, H=0.50 ft. The width of notch at pond level is x = 1.00 ft. Calculate the discharge if μ = 0.60

Area of notch below headwater pool, A = 2/3 X 0.50 X 1.00 = 0.33 sq. ft.
Width of notch at pond level, x = 1.00 ft.

Shape factor, $m = \frac{0.50 \times 1.00}{0.33} = 1.50$

From Fig. 1, C = 2.8

$Q = 2.8 \times 0.33\sqrt{0.50} = 0.66$ cu. ft. per sec.

Example 2 – A circular weir is 1.0 ft. in diameter. Calculate the discharge under a head, H = 0.50 ft. if μ = 0.58

Area of notch below headwater pool, A = 0.392 sq. ft.
Width of notch at pond level, x = 1.00 ft.

The shape factor, $m = \frac{1.00 \times 0.50}{0.392} = 1.28$

From Fig. 1, C = 2.9

$Q = 2.9 \times 0.39\sqrt{0.50} = 0.80$ cu. ft. per sec.

By arranging the three simple openings in order of complexity—orifice, and rectangular and triangular notch, it is evident that the area of segment below headwater-pool level varies, respectively, as the "zeroth" power of the head (area of orifice is constant), as the first power of the head and as the second power of the head. In addition, the fraction $\frac{C}{\mu\sqrt{2g}}$, equals 1.0 for the orifice, ⅔ for the rectangular weir and 8/15 for the triangular notch. These values are tabulated in Table I. The weir or orifice is indicated in column 1; how area of notch varies as an exponent of head in column 2, and the value of $\frac{C}{\mu\sqrt{2g}}$ in column 3.

In column 3 the terms are set out to show inductively that $\frac{C}{\mu\sqrt{2g}}$ notches (a), (b), (c) and (d) is a series product of *even* terms in the numerator and *odd* terms in the denominator.

Odd-shape weirs analyzed

Proportional-head, parabolic and semi-cubic weirs have been proposed from time to time for measuring water flow and theoretical formulas have been published. These formulas may be analyzed similarly to those above. The factor, $\frac{C}{\mu\sqrt{2g}}$, is then found to be $\frac{\pi}{4}$, $\frac{3\pi}{16}$, $\frac{15\pi}{96}$, for proportional-head, parabolic and semi-cubic weirs, respectively.

By arranging these fractions in tabular form (Table I—e, f, g), the factor, $\frac{C}{\mu\sqrt{2g}}$, is also found to be a series product but of *odd* terms in the numerator and *even* terms in the denominator, in each case multiplied by $\frac{\pi}{2}$.

A single graph (Fig. 1) may be constructed from Table 1 by plotting the discharge factor $C = \frac{Q}{A\sqrt{H}}$, as ordinates and a shape factor, $m = \frac{\Delta \log A}{\Delta \log H}$, as abscissas. The shape factor m, shows by what power of the head on the notch, H, the notch area, A, varies. Three values of μ equal to 0.58, 0.60 and 0.62, are plotted in Fig. 1.

The shape factor

$$m = \frac{\Delta \log A}{\Delta \log H} = \frac{\frac{\Delta A}{A}}{\frac{\Delta H}{H}}$$

But $\Delta A = x(\Delta H)$ in which x = width of pond notch at pond level, in feet. H = head on the crest, in feet. Then

$$m = \frac{\frac{x\,(\Delta H)}{A}}{\frac{\Delta H}{H}} = \frac{Hx}{A}$$

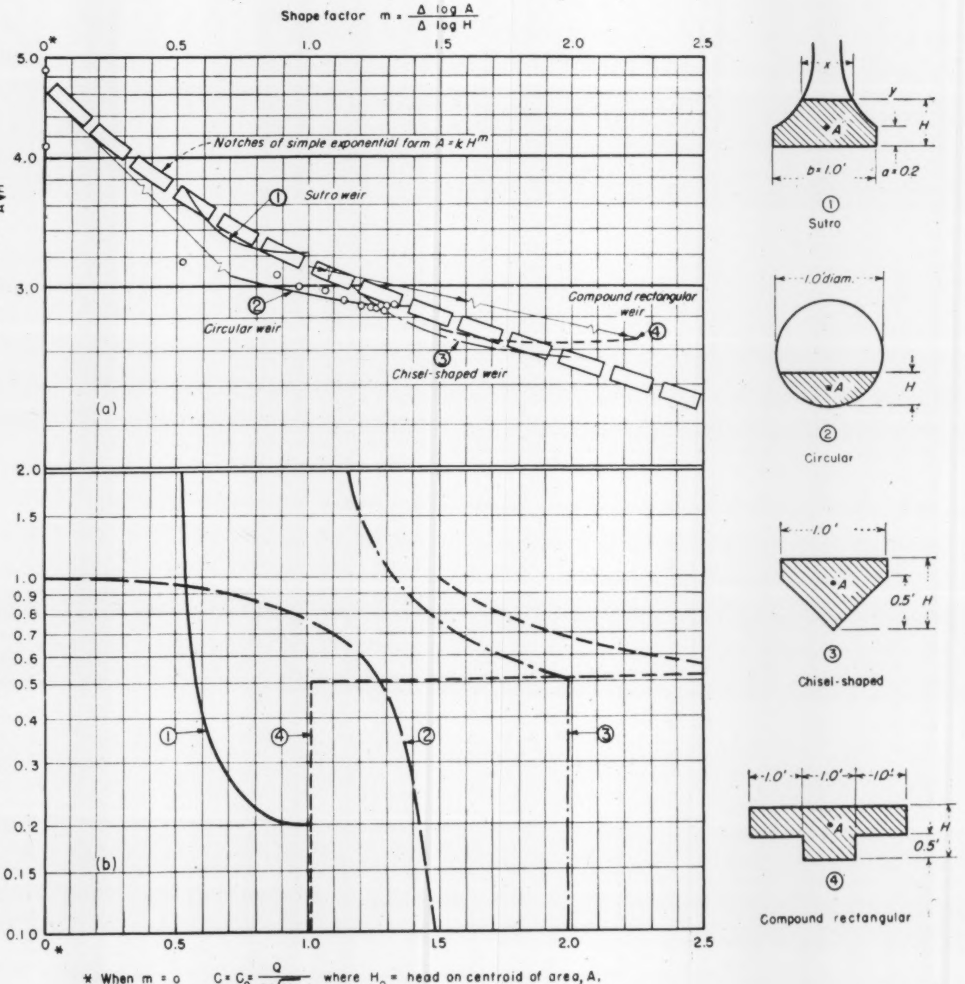
The denominator of the shape factor is the area of notch below pond level; the numerator is the area of a rectangle whose altitude is the head, H, and whose base is x, the width of notch at pond level.

In other words, the shape factor,

$$m = \frac{(H)}{\left(\frac{A}{x}\right)},$$

is the ratio of head on the crest to the hydraulic mean depth of the notch below pond level.

If the area varies simply as a power



* When m = o $C = C_0 = \frac{Q}{A\sqrt{H_0}}$ where H_0 = head on centroid of area, A.

Fig. 2. Discharge factors for unconventional notches (at right) with variable shape factor may be found by use of this graph.

of the head, the graph of area plotted as a function of *head* on logarithmic paper will be a straight line whose slope (with reference to the axis of heads) is equal to the shape factor, *m*. This analysis (Fig. 1) shows that orifices and weirs of simple exponential shape can be fitted together into an orderly "perspective" in which the theoretical discharge factor, C, can be interpolated from a graph. Calculation of free discharge over a weir then involves only finding the product of the discharge factor, area of notch below headwater pool and square root of head on the crest.

If area of notch does not vary as a single (constant) exponent of head, the discharge factor will not remain absolutely constant. However, Fig. 1 may still serve as a useful guide for estimating flow of water over nonregular weirs in terms of area and head on the crest. In this case the shape factor is defined (at any head above the crest) as the slope of the tangent to the curve resulting from area of notch plotted against head on logarithmic paper.

An analysis of four non-regular weirs—Sutro (proportional head), circular, chisel-shaped and compound rectangular—is shown in Fig. 2. As the first analytical step, area of notch below headwater-pool level is plotted on logarithmic paper as a function of head on the crest. From this set of curves (not shown here), the slope of the tangent relative to the axis of heads was plotted as an abscissa and the corresponding head as ordinate as in Fig. 2 (b).

The general curve of Fig 1 is shown as the blocked line in Fig. 2 (a). The discharge factors (curves 1, 2, 3, and 4) were determined by integration of the basic flow equation over the corresponding weir with a constant coefficient, μ. Moreover, plotted data are based on tests of a circular weir. These data (curve 2) are in satisfactory agreement with the general curve and show the complete range of transition from weir to orifice flow.

FIELD AND OFFICE

A HUNG CEILING was constructed rapidly beneath an 8½-in. reinforced concrete slab with a tool operated with blank cartridges. Weighing less than 5 lb., this tool drove metal studs into the concrete through 2x3-in. furring. Hangers nailed to the joists dropped the ceiling 2 ft., and then nailing strips were added to take acoustic boards.—Mine Safety Appliances Co., Pittsburgh, Pa.

◆

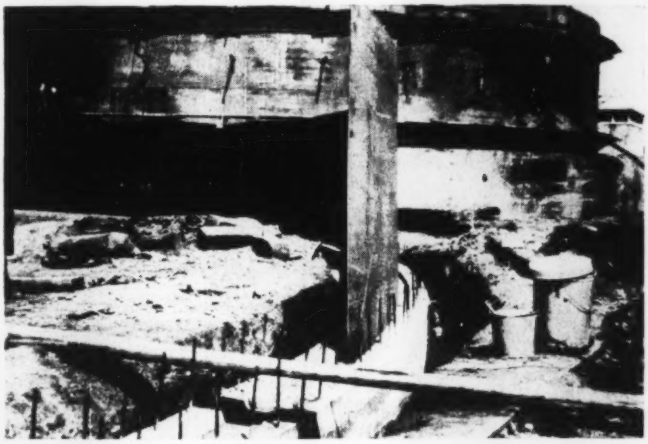
Steel Dikes Around Oil Tanks

Useful design and construction practices for inclosing oil and gasoline storage tanks within steel plate dikes are exemplified in an installation recently made for the Coastal Oil Co. at Port Newark, N. J., by The Hammond Iron Works. According to Fred L. Plummer, Hammond's director of engineering, local conditions at the site precluded the use of low earth dikes, and comparative cost estimates demonstrated the economy of using steel dike walls rather than walls of reinforced concrete.

The installation included three 96,000 bbl. storage tanks 120 ft. in diameter and 48-ft. high. Each tank was surronded by a steel-dike wall 24-ft. high having a diameter of 172 ft. As shown on the accompanying illustration, the dike plates are set on a foundation ring. The plates are supported on small bearing plates spaced on 4-ft. centers in the center groove at the top of the concrete ring. After the steel dike wall was erected and welded, the reinforcing bars, shown extended above the concrete ring, were bent over and welded to the steel wall. Concrete was then added to embed these bars. The height of the foundation above the top of the bars was raised with a mastic fill placed adjacent to both sides of the steel wall at its junction with the concrete.

When completed, the top of the steel-dike wall was stiffened with an inside wind girder which also serves as a deflector to reduce the possibility of a "boil over" wave. This girder is wide enough to serve as an emergency walkway around the top of the steel-dike wall.

In Mr. Plummer's opinion, a higher design stress is justified for dike plates than for tank plates, since they would only be subjected to bursting stresses if the tank fails completely. Moreover, both sides of dike plates can be maintained by painting, which is not true of tank plates. A design unit stress of 27,000 psi, is suggested, together with a joint efficiency of 85 percent for butt-welded joints. As to fire hazard, only the steel above the liquid level would be affected, and since this part of the shell is virtually unstressed, the safety of the installation is adequate.



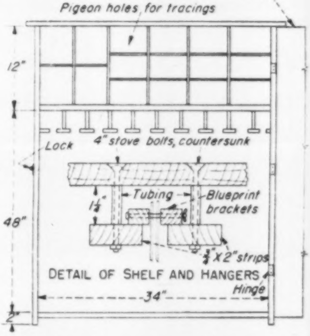
STEEL DIKES UNDER CONSTRUCTION, with first ring of plates being assembled on the foundation.

◆

Cabinet Holds Drawings

Construction drawings can be kept both flat and handy in a 62 x 36 x 36 in. plywood cabinet that can be quickly made on the job.

The ¾-in. plywood cabinet is equipped with a door and lock. Pigeon holes for tracings or working drawings are included at the top according to need. Then 2 x ¾-in. strips are hung from the shelf, with 2-in. dimension horizontal, by four 4-in. stove bolts in each. Salvaged copper tubing cut to 1¼-in. length separates the upper shelf and hanger strips.


Plywood door
Pigeon holes for tracings
12"
Lock
4" stove bolts, countersunk
Tubing
Blueprint brackets
1¼"
48"
¾"X2" strips
DETAIL OF SHELF AND HANGERS
Hinge
34"
2"

DETAILS of a construction-job map cabinet for field office.

Bound with wood strips along one edge, sets of plans up to 1-in. thick, 33 in. wide, and about 45 in. long fit into each 1-in. slot between hangers. CHARLES H. JOHNSON, Coytesville, N. J.

◆

Long Steel Tapes

Two steel stapes, each 1200 ft. long, are being used to expedite distance measurement on the Pittsburgh Geodetic and Topographic Survey. Tension is applied by 50-lb. weights acting through pulleys suspended from pipe tripods at each end. Special tables for irregular sag were computed. A check of one measurement indicated a probable error of 1:40,000.

BOOK REVIEWS

Design of Timber Structures

Timber Engineering Handbook—By Howard J. Hansen. 882 pp. John Wiley & Sons, New York: Chapman & Hall, London. $10.

Simplified Design of Structural Timber—By Harry Parker. 218 pp. John Wiley & Sons, New York: Chapman & Hall, London. $3.25.

Professor Hansen's handbook undertakes to bring together the latest information about timber and wood construction that designers now can find only by searching through many publications. Included are data on plywood, laminated wood construction and the use of ring connectors in framing timber. About half the book is given over to a table of uniformly distributed loads for various sizes of lumber and for spans from 3 ft. to 50 ft. from which such factors as maximum horizontal shear and maximum deflection can be obtained.

Professor Parker's text is one of a series of elementary books relating to the design of structural members in buildings. It is devoted in large part to the solution of practical problems.

Surveying Instruments

Surveying Instruments, Their History and Classroom Use—By Edmond R. Kiely. 411 pp. Bureau of Publications, Teachers College, Columbia University, New York, N. Y. $3.00.

Bringing geometry to life in the minds of secondary students is the purpose of this scholarly discussion of pre-modern mensuration. While it is intended primarily as an aid to high school mathematics teachers, the book has some features that recommend it as background material for surveying teachers.

These features are in the first four chapters, where the author traces instruments from their beginnings, in Egypt, China and Babylonia, to their status during the Renaissance.

The earliest instruments made use of the right angle and the plumb bob, for leveling, prolonging a straight line, establishing a right angle and orienting a line (by sighting on Polaris). Several standards were used for direct measurement.

Fluid leveling and angle measurements, both horizontal and vertical, came later. The compass became known in the Middle Ages, and it was used for surveying in the Thirteenth Century. The most important angle-measuring device from a historical standpoint is the astrolabe, which was developed in the Second Century B. C., and which still may be found in use. The astrolabe measures vertical angles, and in many of its improved forms is has an inscribed square which indicates the tangent relationship.

A Renaissance derivative of the astrolabe, the torquetum, is similar in function to the modern direction theodolite, having both a vertical circle and a single-motion horizontal circle.

Throughout the historical portion of the book there is an emphasis on instrumental measurement of inaccessible dimensions. The purpose of this emphasis becomes clear in the remainder of the book, which consists mainly of problems in indirect measurement. Each problem is a field exercise related to the principles of geometry, intended to encourage students' understanding of the subject. The author urges the use of primitive instruments because they are simple and fundamental. Precise instrumentation is outside the book's scope.

This is the nineteenth of a series of yearbooks of the National Council of Teachers of Mathematics.

Miscellaneous Notes on Booklets and Reprints

Opposition to Toll Roads is advocated in two publications of the National Highway Users Conference, National Press Bldg., Washington 4, D. C. One is an illustrated pamphlet entitled "Why The Toll Road Method of Financing is Unsound", and the other is a small folder, "Toll Roads are Not the Answer."

Letter Symbols for Physics, one of the series of letter standards being compiled by the American Standards Association has just been issued under the title "American Standard Letter Symbols for Physics, Z10. 6-1948." Copies can be obtained from the association office 70 East 45th St., New York 17, for $1.

The First Postwar Issue of a magazine called Task has appeared. Founded before the war to examine the physical, social and economic aspects of city and resources planning, housing and architecture, Task presents in the current issue articles on town planning and the reconstruction of war-damaged cities written by architects engaged in this work. This issue states that frequency of publication will depend on the support received. Copies can be obtained for $1 from Task, P. O. Box 117, Cambridge 38, Mass.

A New Journal is being published by the Geotechnical Society, 123 Victoria St., London, S.W. 1, under the title of Geotechnique. It is to be devoted primarily to soil mechanics, engineering geology and foundation engineering. The first issue appears under a date line of June, 1948. It contains a foreword by Karl Terzaghi, four papers in English and two in French. The subscription rate is one pound ($4.03). Subscriptions from this country may be made through Ralph B. Peck, research professor of soil mechanics, 113 Talbot Laboratory, Urbana, Ill., who is serving temporarily as American editor for the magazine.

New Engineering Books

Floods—Their Hydrology and Control—By H. K. Barrows, S. B. 432 pp. McGraw-Hill Book Co., New York 18, and London. $6.50.

Fluid Dynamics—By Victor L. Streeter. 263 pp. McGraw-Hill Book Co., New York 18, and London. $5.

Advanced Dynamics—By S. Timoshenko and D. H. Young. 400 pp. McGraw-Hill Book Co., New York 18, and London. $5.50.

Treatment and Disposal of Industrial Waste Waters—By B. A. Southgate. 327 pp. His Majesty's Stationery Office, London. Price 12/6d ($3.65).

Introduction to Engineering Problems—By R. Q. Brown. 191 pp. Prentice-Hall, Inc., New York. $3.95.

Civil Engineering for the Clerk of Works—By Vernon C. Whiting and K. Mills. 152 pp. Longmans, Green and Co., London and New York. $2.75.

Iran: Past and Present—By Donald N. Wilber. 234 pp. Princeton University Press, Princeton, N. J. $3.

Builder's Materials—Second Edition—By Bernard H. Knight and R. G. Knight. 304 pp. Edward Arnold & Co., London; Longmans, Green & Co., New York. $5.25.

(Continued on page 100)

A MESSAGE TO AMERICAN INDUSTRY • 71st OF A SERIES

"Give us the tools . . ."

What Are YOUR Chances If There Are No Profits?

Since the November 2 election there has been a dazzling variety of plans to have the government do more and more things and spend more and more money. But there is almost no variety in the plans which are suggested to raise the money.

"Pay for it by taxing profits," is the standard refrain. Slap on an "excess" profits tax. Boost the corporations' income tax rate.

Well – why not? Haven't the corporations been making so much money that a big chunk of it can be turned over to the government spenders without hurting anybody?

The answer is no!

How high profits should be can be debated endlessly. Some people claim that 1948 corporation profits, which will amount to about $20 billion, are too high. They emphasize the fact that profits are larger in relation to investment than they were a few years ago. Other people think profits are low. They stress the fact that profits are not much larger in relation to sales than they have been historically. Both sides agree that in some individual cases profits have been too high, as in others they have been too low or non-existent.

But if we cut the total volume of profits drastically, we shall do so at our national peril.

There is no room for debate about that. For we shall choke off the crucially important job of building new plants and equipment for our industries. Squeeze hard enough, and America will go the way of Britain – down the long and painful skids of industrial decline. Widespread unemployment, especially among our industrial workers who produce new plants and equipment, will mark the dreary way. Here is a fact which the President, the Congress, the C.I.O., and all of us have a real reason to remember:

Almost two-thirds of all profits today are going to rebuild and improve plants and equipment.

More than $13 billion of this year's profits are being plowed back. They are going – as a large proportion of profits have always gone – to buy for workers better tools to work with, better surroundings in which to work. They are making possible better products, and more of them, for all of us.

The figures below show how companies have put more and more profit-dollars and a larger share of their profits to work in the business:

YEAR	PROFITS REINVESTED	% OF TOTAL PROFITS
1929	$2.6 billion	31%
1939	1.2 "	24%
1943	5.9 "	57%
1944	5.2 "	53%
1945	4.2 "	47%
1946	6.9 "	55%
1947	11.2 "	**62%**
1948 est.	13.0 "	**65%**

continued on next page

The record shows that each of us is the real beneficiary of this plowing back of profits.

Every American has benefited from these profits. Each dollar that business has put into its plants and equipment in the last thirty years has increased our yearly production by 35 cents.

This re-investment of profits has helped make possible a 75% increase in living standards since 1919.

It has helped increase wages from an average 48 cents an hour in 1919 to $1.36 today. Allowing for higher prices, that increase means that an hour's work today will buy twice as much as it did thirty years ago.

Why must business retain these billions of profits to improve its plants and equipment? Why must it plow back more and more? *The reason is that business already is caught in a tax squeeze.*

Federal taxes alone take at least thirty-eight of each one hundred dollars a company earns. Then, if the company pays out to its stockholders any part of what is left as dividends, the federal personal income taxes of the stockholders may take up to 77% of those dividends. Under these conditions, so few people are willing to invest in industry that the stock market is stagnant. Companies can not raise in that market the money they need for improvements.

The result: business must rely more and more on plowed-back profits to pay for new plants and equipment.

We know that everywhere in industry new and better ways of producing goods are standing ready for use. The previous editorial in this series mentioned some of them. We know, too, that depression and war put our industries far behind schedule – as much as $100 billion behind – in getting the new tools they should have had to keep themselves in first-class shape. McGraw-Hill is now completing a survey of industry that will measure these needs. The results will be published in this editorial series. We know already that in 1949 alone industry will need $18 billion or more for this purpose.

And all but a small fraction of that sum must come from profits.

Our prosperity, our strength as a nation, our hopes for better living depend on our continuing to generate and to plow back a large volume of profits.

For that reason we should not thoughtlessly follow these people who propose to pay for any and all new government activities by saying simply, "Soak the corporations." There is no need to follow them. There are other ways of obtaining necessary funds.

First and foremost should be economy within the government itself. If its citizens must pay still higher taxes, then surely government should exercise rigid self-restraint, cutting out all but the most essential activities and expenses.

After economy should come consideration of a broader federal tax base.

If these and other methods of raising money are inadequate and if taxes must take a bigger bite from business profits, two facts are clear. We should not adopt an "excess" profits tax with all of its complications and all of its corrupting effect on business. A moderate increase in the regular income tax on corporations is much less dangerous. *But even such an increase, if necessary, should be accompanied by special allowances for expansion and depreciation that will encourage companies to continue spending their earnings for new plant and equipment.* We all have a stake in that.

At this critical juncture in our history profits have a new and vastly more important role than they have ever had. In unprecedented degree they are the drive behind our present prosperity and the key to a better, stronger future.

Give profits the axe and the blow does not stop there.

It cuts into the employment, the prosperity and the strength of our nation.

Everyone of us has a stake in how the President and Congress handle taxes on profits – and now is the time to remind them of that stake.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

PITTSBURGH EMPIRE *Compounds*

SINGLE REGISTER
SUPER-ACCURATE EMPIRE METER
STRAIGHT-THRU FLOW (FOR PROPELLER UNIT)
COMPACT DIMENSIONS LIGHT WEIGHT
ROLLER BEARING MOUNTED PROPELLER
SWING ACTION COMPOUNDING VALVE

ROCKWELL

6 *ADVANTAGES*

FOUND IN NO OTHER DESIGN

. . . and no other meter furnishes so many *conveniences* for the operating man. Consider the single register that speeds meter reading and eliminates errors. Compare the light weight of these meters against that of conventional compounds. One man can install a 3 in. Pittsburgh-Empire alone. Don't overlook maintenance ease. Full accessibility to all parts has been provided.

The Pittsburgh-Empire Compound meter can be quickly dismantled or assembled while in the line. It runs smoothly, quietly, without pulsation.

Such operating conveniences, plus sound mechanical advantages add up to the greatest compound meter value ever offered. Instruction bulletin W-803 gives full facts about this superior design. Write for it!

PITTSBURGH EQUITABLE METER DIVISION
ROCKWELL MANUFACTURING COMPANY · PITTSBURGH 8, PA.
Atlanta Boston Chicago Houston Kansas City Los Angeles
New York Pittsburgh San Francisco Seattle Tulsa

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents
February Materials and Labor Prices will appear in the February 10, 1949 issue

CEMENT, AGGREGATE, READY-MIXED CONCRETE — F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots incl. $1.00 per bbl. for bags, cash. dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.; truckload del.; per block		CONCRETE Ready Mixed 1:2:4, over. 50 c.y., del.
	Cloth	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt.wgt.Agg.	
Atlanta	$4.11	$3.36	$3.05	$2.00	$2.00	$1.75	$2.10	$2.10	$1.65	$1.85	$0.1725	$0.1725	$11.00
Baltimore	4.12	3.37	3.06	2.30fft	2.30fft	1.95fft	2.60fft	2.70fft	2.45fft	2.45fft	.16	.16w	9.85
Birmingham	3.80	3.05	....	2.06	2.06	1.66	2.50	2.50	1.00	1.20	.165	.165	7.75
Boston	4.44	3.69	3.40	2.50t	2.50t	2.50t	1.50t	1.60t	....	....	.17	.185w	10.50m
Chicago	3.61/3.67	2.86/2.92	2.56/2.62	2.75‡d	2.75‡d	3.20‡d	2.75‡d	2.75‡d	2.00‡	2.00‡	.20	.20x	....
Cincinnati	4.00	3.25	2.94	1.85‡pp	1.85‡pp	1.75‡pp	2.95‡bb	2.95‡bb	2.30	2.30	.19	.195	10.40hh
Cleveland	3.92	3.17	2.82	1.90llg	1.65llj	1.55ll	3.55‡h	3.55‡h	2.75	2.75	....	.21	11.80aa
Dallas	3.57	2.82	2.52	2.00	2.15	1.75	2.10	2.15	....	....	.0775p	.285	9.30
Denver	....	3.59	3.29	1.85	2.00	1.15	....	....	....	....	.20	.23w	9.65
Detroit	3.98	3.20	2.92	3.25‡	3.25‡	3.00‡	3.00‡	3.00‡	3.00‡	3.00‡	.17	.18w	9.60kk
Kansas City	....	....	....	2.05	2.05	1.50/1.80t	1.45q	1.45q	....	....	.17wf	....	10.40n
Los Angeles	....	3.72b	3.34b	1.92t	2.02t	1.72tnn	1.92t	1.92t	....	....	.085oo	....	10.78m
Minneapolis	4.05dd	3.30dd	3.00dd	2.30h‡j	2.30h‡j	1.35h‡j	2.50h‡j	2.50h‡j	....	....	.21cco	....	10.70jkk
Montreal	....	2.39rqq	2.24rqq	1.25bbs	1.75bbs	....	1.35cs	1.60cs	....	....	.177rr	.1665wrr	8.95ls
New Orleans	....	3.07	2.75	2.32	2.32	1.82	....	....	.90	1.15	.23	....	10.65
New York	....	4.00/4.20‡	....	2.00de	2.00de	1.45de	2.25dv	2.25dv	....	....	.18ii	.18wccii	10.30k
Philadelphia	4.15‡	4.00‡	3.10‡	2.30‡	2.40‡	2.05‡	1.90‡	1.95‡	1.50	1.50	.18/.22	.18/.22w	9.85
Pittsburgh	4.15†	3.38†	3.10†	2.05‡	2.05‡	2.85‡	2.50‡	2.50‡	2.05	2.05	.23z	.23z	11.50
St. Louis	3.80o	3.05o	2.75o	2.60‡oh	2.40‡oh	2.00/2.40‡oh	1.50c	1.50c	1.70	1.15	.225	.24yo	10.40
San Francisco	....	3.38	2.98	1.84	1.84	1.94	1.94	....	....	....	....	.25y	10.75u
Seattle	....	3.45mm	2.95mm	2.75‡od	2.75‡od	2.75‡od	3.50‡od	3.50‡od	....	....	.22o	....	9.75o

‡ Delivered. *a* F.o.b. truck at plant. *b* 10c. per bbl. off for payment by 10th of following month. *c* F.o.b. quarry. *d* Per cu. yd. *e* Barge lots alongside docks, Man. *f* F.o.b. truck on job. *g* Pea gravel. *h* Truck Lots. *i* ½ in. *j* 5% discount for cash. *k* 5 cu. yds. or over, del. Man. *l* 2000 lb. concrete. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 5¾ x 8 x 12 in. *q* F.o.b. truck at plant. *r* 10¢ per bbl. off cash 20 days. *s* Sales tax included. *t* Truck delivery. *u* 10 to 100 c.y. brackets. *v* F.o.b. scow, Hudson River, N. Y. *w* Cinder. *x* Waylite. *y* Havdite. *z* Celocrete. *aa* Aver. haul, 7-9 mi. zone. *bb* Under 5 tons. *cc* 8 x 8 x 18 in., also. *dd* Dealers sell only in LCL. This is price for CL and does not include dealer's commission. *ee* 20c refund for each returnable bar. *ff* LCL. *gg* 10c. refund for each returnable bag. *hh* Truck loads up to 500 c.y. Over 500 c.y. lots, 50¢ less per yd. *ii* Yard price. *kk* 2500 lb. compression strength. *jj* 30¢ refund for each returnable bag. *ll* Price at plant, called for. *mm* 10¢ per bbl. off cash 10 days. *nn* Concrete sand. *oo* 4 x 8 x 12 std. wgt. *pp* 5 tons or more. *qq* Dealer's commission not included. *rr* F.o.b. * Prices include dealer's commission except where indicated to the contrary. † Prices not stable.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount **10c. per bbl. for payment within 15 days of date of invoice.** Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not included. For cloth bags, add $1.05 per bbl.; 25¢ refund allowed for each returnable bag; for paper bags add 30¢ per bbl., not refundable.

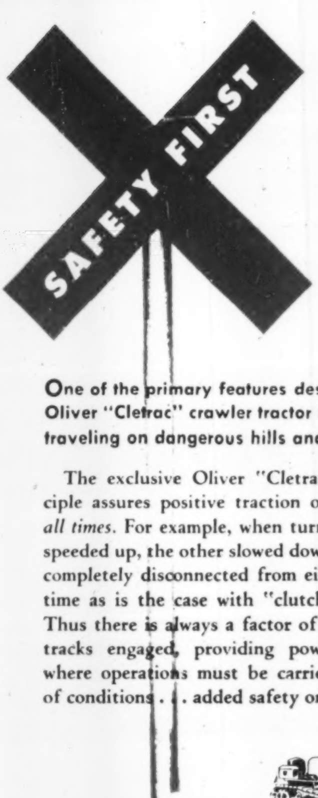
	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn.	$2.40†	Buffington, Ind	$2.20	Steelton, Minn	$2.40	Muskegon, Mich	$2.40†	Toledo, O	$2.40†
Clinchfield, Ga	2.40†	Independence, Kan	2.30	Leeds, Ala	2.25	Saginaw, Mich	2.35†	Milwaukee, Wis	2.40†
Kingsport, Tenn	2.40†	Hannibal, Mo	2.35	Duluth, Minn	2.40	Wyandotte, Mich	2.30†	Green Bay, Wis	2.40†
West Des Moines, Iowa	2.30†	Northampton, Pa	2.30	Hudson, N. Y	2.30	Buffalo, N. Y	2.40†	Ironton, O	2.30
Nazareth, Pa	2.30†	Universal, Pa	2.30	Alpena, Mich	2.25†	Oswego, N. Y	2.40†	Montreal City	2.08
Bath, Pa	2.30†	Waco, Tex (+ 9¢ tax)	2.20	Detroit, Mich	2.40†	Cleveland, O	2.40†		

† *Prices to hold for first quarter of 1949.*

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS — F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80-300 penetration		CUTBACK ASPHALT Per ton		ROAD OIL Per gal.	ASPHALT EMULSION (Quick-breaking) Per gal.	
	Granite per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$73.00	$35.00	$2.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Baltimore	150.00‡	52.70‡	.....	$23.00	.....	$.095	$0.15	$.095h	$.17h	$.09v	$.095	$0.115
Birmingham	.....	32.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston	.....	.....	.....	23.00o	$34.00o	.0936o	.175o	.095ho	.185ho	.09o	.103o	.195o
Chicago	150.00‡y	85.00/88.00e‡	3.10/4.15d‡	22.50b	32.00b	21.50bg	31.00bg	.097/.10bh	.....	.082/.0845b	.0925/.1025b	.14/.165b
Cincinnati	.....	.....	.....	24.50ff	.....	.1035	.....	.1035h	.....	.....	.....	.....
Cleveland	180.00	49.00t	3.87u	30.00	40.00	29.50g	39.50g	.135h	.22h	.14	.14	.27
Dallas	l	40.00	l	23.38	42.17	.0987	.1837	26.15	46.65	.0962	.1037	....
Denver	.....	43.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	....	.....	.....	27.25	.....	.....	.....	.....	.....	.....	.....	.183
Kansas City	.....	40.00q	.....	20.45r	.....	.....	.....	.081hr	.....	.071r	.....	.....
Los Angeles	l	.....	l	18.10mf	32.60mfw	18.10gm	32.60mw	19.10m	26.10mw	17.60gm	.0775cc	.1475cc
Minneapolis	.....	.....	2.79d	28.00	37.00	23.00g	34.00g	27.00	38.00	.105	.13	.23
Montreal	140.00	.....	.....	25.00k	34.65k	15.70kp	19.95kp	15.30kp	17.30kp	14.20kj	.174k	.215k
New Orleans	.....	.....	.....	20.00a	.....s	20.00ga	.....s	.095hadd	.....s	.095	.0975	.16n
New York	.....	.....	2.50d	29.00	42.69*	28.00g	41.89g*	.1190h	.1826h*	.1140	.1190	.1817*
Philadelphia	150.00	75.00	4.06	23.00	.....	22.00g	.....	.095h	.....	.....	.....	.....
Pittsburgh	165.00	42.00	4.50	26.00	39.00	.12	.24	27.00	40.00	.095	.10	.21
St. Louis	.....	.....	.....	21.40	.....	.....	.....	.....	.....	.....	.1025	.....
San Francisco	.....	57.75c	.....	18.10es	32.60wee	18.10geeff	.....	20.10ee	.....	.....	.0775	.1475
Seattle	.....	.....	.....	18.10i	37.35i	17.60ig	.....	20.10i	24.10aai	18.60ig	.0775i	.0925

‡ Delivered. *a* F.o.b. Baton Rouge. *b* F.o.b. refinery. *c* 2¾ x 8½ x 4 in. *d* 2-in. interior block, 6-lb. treatment. *e* 3½ x 4 x 8½. *f* 40-80 penetration. *g* Per ton. *h* Per gallon. *i* F.o.b. Martinez. *j* Shipped in drums, per drum. *k* Tax included. *l* Not used. *m* F.o.b. refinery, El Segundo. *n* 55 gal. drums. *o* Price at plant, in Everett. *p* Per 100 gal. *q* F.o.b. Buffalo. *r* F.o.b. Sugar Creek, Mo. *s* Drums not available. *t* Truck deliveries in Greater Cleveland. *u* 3-in. *v* Bulk, refinery. *w* Shipped in steel barrels, no longer in double head wood barrels. *x* Truck deliveries in Detroit $75.00. *y* Carload lots. *aa* In customer's drums. *cc* F.o.b. refinery, Inglewood. *dd* Medium curing. Rapid curing, $.0975; slow curing, $.0925. *ee* F.o.b. Richmond. *ff* 50-300 penetration. * Use of reconditioned drums.



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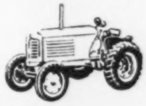

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A complete line of Crawler and Industrial Wheel Tractors

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"THE SIGN OF EXTRA SERVICE"

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT. SHAPES–PLATE	REINF. BARS billet *ab*	RIVETS ¾-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard*e*	Light *cf*	Re-rolled	TRACK SUPPLIES Angle Bars	Std Spikes	Tie Plates*g*	Track Bolts *d*
Birmingham Area	$3.25	$3.35	$6.75	....	$64.00	$71.00	Not	$4.25	$5.35	$4.05	....
Chicago Area	3.25	3.35	6.75	$4.05	64.00	71.00	avail-	4.25	5.35	4.05	....
Pittsburgh Area	3.25	3.35	6.75	4.05	64.00	71.00	able	4.25	5.25	4.05	....
Buffalo Area	3.30	3.35	6.75	4.05	64.00	71.00	....	4.25	5.35	4.05	$8.50
Cleveland	....	...	6.75	...	....	.....	....	...	...	....	8.50
Youngstown Area	....	3.35	....	....	.....	....	....	...	5.35	...	....
Geneva	3.25	.....	....	....	....	....	...	...	....	....	....
Los Angeles	....	4.10	....	....	....	.....	....	....	5.35	....	....
Pueblo	3.25	3.35	....	....	64.00	71.00	....	4.25	5.35	4.05	8.50

a To fabricators. To consumers: $4.25; except $5.00 Seattle, Wash. *b* Rail steel price $4.65; Williamsport, Pa *c* Rail steel $102 per ton Williamsport, Pa. *d* Treated. Untreated $8.25. *e* Except $70.00 Indiana Harbor, Ind. *f* Except $85.00 Minnequa, Colo. *g* Except $4.20 Pittsburg, Calif.; $4.50 Seattle, Wash.

IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS*g* Per 100 lb., base price *u* 5 tons to carload lot *b* New billet	Rail steel	Add switch	$/cwt for Del.	EXPANDED METAL LATH*k* Per 100 sq. yd., carload lots Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING*d* Per 100 sq. ft., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires
Atlanta	$4.75	$5.225*k*	$5.225*k*	$.025	$.10	$31.50	$31.50	F.o.b. Mill: Joliet, Illinois, Donora, Penn., $2.36 Monessen, Penn., $2.40	F.o.b. Mill: Joliet, Illinois, Donora, Penn., $1.63 Monessen, Penn., $1.66	F.o.b. Mill: Joliet, Illinois, Donora, Penn., $2.47 Monessen, Penn., $2.52
Baltimore	5.48	4.47*l*	....	....	.10	40.00	43.00			
Birmingham	5.15	5.15	5.50	.05	.15	43.00*p*	45.50*p*			
Boston	5.54*k*	5.46*k*	5.34*kc*	....	.10/.15	31.00	33.00			
Chicago	5.05	4.20/4.70*ff*	4.20/4.70*ff*	.05	....	31.00‡	33.00‡			
Cincinnati	5.60‡*r*	5.55*r*	....	....	....	33.00*zee*	35.00*zee*			
Cleveland	5.60*hh*	4.37*v*	....	....	.10	34.50	36.50			
Dallas	6.30	6.25	6.25	....	....	33.75	35.75			
Denver	6.30	6.45*c*	....	....	....	43.00*s*	50.00*qs*			
Detroit	5.25*		....	....	.10	33.50*r*	44.00*q*			
Kansas City	6.00	4.75*a*	....	....	....	37.00	39.00			
Los Angeles	5.70*f*	6.10*bb*	....	....	.15	41.00*f*	45.00*kk*			
Minneapolis	5.90‡	6.19*ccn*	6.19*ccn*	....	.15	34.50	36.50			
Montreal	5.25*i*	4.70*i*	4.70*i*	....	....	44.10*h*	46.80*h*			
New Orleans	...	5.00*ok*	....	.05	.10	32.00	32.00			
New York	5.68*r*	6.00	6.25	....	.15/.20	34.50*st*	36.50*st*			
Philadelphia	5.04	5.15	....	....	....	30.00‡	32.00‡			
Pittsburgh	4.40/4.50	4.40/4.50	4.40/4.50	.05	.10	32.50	34.50			
St. Louis	5.39*k*	5.24*c*	5.24*c*	....	....	42.00*aa*	48.00*aa*			
San Francisco	5.90*ii*	5.65	....	....	....	36.50	38.50			
Seattle	4.30*e*	5.25*el*	....	....	....	52.00*s*	42.00*s*			

‡ Delivered. *a* Mill prices. *b* 1-5 tons, add 35c. Less than 1 ton, add 50c. *c* 20 tons or over base. *d* Mill price plus freight. *e* F.o.b. plant. *f* Includes delivery in free delivery zone. *g* High scrap steel prices cut former 15c. differences between new billet and rail steel. *h* List price. Dominion tax exempt. Provincial and Municipal tax extra. *i* Plus Dominion, Provincial and Municipal sales tax. *j* Price per ton. *k* F.o.b. city. *l* Intermediate and hard grade, new billet. *m* Per sq. yd. *n* 5 to 8 tons base. *o* 5 to 15 tons base. *p* Del. of 5000 sq. yd. or less. *q* Std. ribbed. 4 lb. per sq. yd. *r* 5 tons or over. *s* LCL. *t* Asphalt coated. *u* Note: Revised size extra—1 in., 1 ⅛ in., 1 ¼ in. 10¢, ⅞ in., ¾ in. 15¢, ⅝ in. 20¢, ½ in. 35¢, ⅜ in. 55¢, ¼ in. $1.30. *v* Under 20 tons. Straight. *w* Copper bearing. *x* 2.5 lb. per sq. yd. *y* $.0093 transportation tax included. *z* Copper alloy. *aa* Delivered truck to job. Contractor to do unloading. *bb* Includes 55¢ extra for ⅜ in. size. *cc* F.o.b. cars Chic. plus freight. *dd* F.o.b. dock. *ee* F.o.b. cars. *ff* Carload lots. *gg* Including sales tax. *hh* Delivered price is $5.60. *ii* Rolled at Geneva mill. Shapes rolled at Fontana, $6.90. *kk* ⅜" ribbed. * Over 10.000 lbs. Sept.-Nov price of $5.45 was for 400—2.000 lbs.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in. *a*	VITRIFIED SEWER PIPE Per foot. Delivered ASTM C13–44T std. 8 in. s.s.	std. 12 in. s.s.	24 in.	36 in.	CLAY DRAIN TILE ASTM C4–24 Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14–41 12 in.	24 in.
Atlanta	$100.10	$0.43	$0.67	$3.39	$7.00	$114.00	$140.00	$0.45	$2.00
Baltimore	104.50	.495	.945	3.45	11.00	147.00	228.00	.80	2.25
Birmingham	93.50	.40	.72	2.84	....	210.00‡	375.00‡	.90	2.50
Boston	107.90	.441*uvx*	.8505*uvx*	3.87*uvy*	10.36*uvy*	173.40	267.60	1.45‡*mg*	3.60‡*mg*
Chicago	106.70	.59	1.14	4.81	13.45	150.00‡	270.00‡	.70	2.35
Cincinnati	105.20	.441	.8505	3.51	9.53	154.80‡	241.20‡	.60	2.25
Cleveland	107.30	.357*x*	.6885*x*	3.015*x*§	8.405*x*§	147.50	231.00	.65	2.50
Dallas	109.08	.375	.684	2.72	6.25	109.00	131.00	.48	1.55
Denver	113.92	.41*dd*	.71*dd*	2.98*dd*	....	......	......	.74*dd*	2.50*dd*
Detroit	107.30	.553	1.10	4.20	12.75	195.00‡*m*	303.00‡*m*	.65	2.50
Kansas City	108.42	.418*m*	.76*m*	...	....	121.00*m*§	418.00*m*	.60*l*	2.00*l*
Los Angeles	120.30	.426	.927	4.532	11.298	193.00‡	324.00‡	.72	...
Minneapolis	110.30	.62*mo*	1.12*mo*	4.35*mo*	11.290	......	......	1.29*h*	3.67*h*
Montreal	90.00	.73*z*	1.28*s*	4.20*z*	6.80*es*	.60*p*	.48*p*	72.00*jkaa*	218.00*jkhaz*
New Orleans	103.10	.412	.762	3.955	9.15	231.00*bb*	......	.55	1.95
New York	103.50/108.40	.62	1.14	4.45	12.30	......	......	1.00	2.25
Philadelphia	101.30	.54	.99	4.08	10.25	235.00‡	300.00‡	1.25*h*	3.20*h*
Pittsburgh	107.82	.364*m*	.702*m*	2.70*m*	6.625*m*	134.20	197.40	1.05*h*	2.50*g*
St. Louis	104.60	.48	.87	3.42	8.05	......	......	1.10*il*	2.25*hl*
San Francisco	120.30	.50*d*	.99*d*	3.96*d*	9.90*d*	188.00*dl*	313.00*dl*	.69	2.85
Seattle	122.10	.51*b*	.91*b*	....	....	150.00*c*	......	.80	2.40

***WROUGHT STEEL PIPE** (Full standard weight)

Mill	2½ & 3 in., Butt Weld† Black %	Galv. %	3½ to 6 in., Lap Weld† Black %	Galv. %
Lorain, Pa.	50.5	32.0	...	...
Aliquippa, Pa	49.5	28.0	46.5*a*	24.5
Sparrows Pt., Md	48.5	27.0	42.5	20.5
Benwood, W. Va	50.5	29.0	44.5	22.5
Youngstown, O	50.5	29.0	...	...
Indiana Harbor, Ind	49.5	28.0	42.5	20.5
Sharon, Pa	48.0	27.0	...	...
Wheatland, Pa	49.5	28.0	46.5*a*	24.5*a*
Etna, Pa	50.5*b*	29.0*f*	44.5	22.5
Fontana, Calif	19.5*b*	+2.0*b*	12.5*ab*	+9.5*ab*

†Threaded and coupled. *a* 3½ to 4 in. *b* Continuous weld.

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, CL, Burlington, N. J. (base) $98.50. Based on existing freight rates; subject to rate change. Gas pipe and class A, $5 per ton additional. 4 in., $5 per ton additional, 30 in. and larger, usually $1 per ton less. *b* Extra strength ASTM C 200-44T. *c* 4-in., $90. *d* SS361-A. *e* 30 in. *g* Culvert pipe. Reinforced. ASTM C76-41. *h* Reinforced. ASTM C75-41. *i* Reinforced. ASTM C76-37. *j* Centrispun. *k* Per 100 ft. *l* F.o.b. plant. *m* Truck delivery. *o* Listed price is based on LCL (no minimum). *p* Less than 5 ton loads, price per ft. *t* Within switching limits. *u* ASTM C13-40. *v* F.o.b. city. *x* 2 ft. lengths. *y* 3 ft. lengths. *z* CESA A 60-1941 specifications used. *aa* No standard specifications in Can. *bb* Freight allowed to destination in city. *cc* Truck loads; f.o.b. plant, Newton. *dd* LCL, delivered, f.o.b. truck.

* WROUGHT STEEL PIPE: Discounts from standard list consumers carload prices. Base price approx. $200 per net ton. List prices per ft.: *Butt Weld:* ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢.; 3 in., 76½¢. *Lap weld:* 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Freight rates to destination to be added to price, plus 3 percent tax on transportation.

WROUGHT IRON PIPE: List prices per ft. same as wrought steel pipe. Discount for Pittsburgh base. *Butt weld* — 1 in. and 1¼ in. black, +4.5, galv. +32.5; 1½ in. black, 1.5, galv. +29.0; 2 in. black 2, galv. +28.5. *Lap weld* — 2½ in. to 3½ in. black + 5, galv. +32.0; 4½ in. to 8 in. black + 2, galv. +27.5. Freight rates to destination to be added to name delivered price.

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	SHORT LEAF YELLOW PINE AND DOUGLAS FIR									LONG LEAF Y. P.		PLYWOOD	
	All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face) *All Fir planks No. 2 common. Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)*									Merchantable grade up to 20 ft.		Rail freight increment (See note for base price)	
	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh	⅝"	¾"
Atlanta l	**$70.00**	**$71.00**	**$60.00**	**$62.00**	**$65.00**	**$68.00**	**$70.00**	......	......	......	......	$22.32	$27.24
Baltimore	**90.00**	**95.00**	**92.00**	**95.00**	**95.00**	**98.00**	**115.00**	......	......	175.00	175.00	22.86	27.90
	120.00	*120.00*	*115.00*	*115.00*	*115.00*	*115.00*	*125.00*	*125.00*	*125.00*	......	......	......	......
Birmingham l	**83.00**	**87.50**	**73.00**	**75.00**	**78.00**	**82.50**	**95.00**	......	......	130.00	125.00	21.78	26.58
l	*80.00*	*80.00*	*77.00*	*77.00*	*77.00*	*77.00*	*93.00*	*93.00*	*93.00*	......	......	......	......
Boston	80.00[3]	80.85[3]	85.00[6]	85.00[6]	85.00[6]	90.00[6]	......	......	......	105.00	105.00	22.86	27.90
	90.00	*90.00*	*92.00*	*80.00*	*80.00*	*100.00*	*100.00*	*100.00*	*100.00*	......	......	......	......
Chicago ‡	**85.00**	**90.00**	**80.00**	**82.00**	**84.00**	**90.00**	**94.00**	......	......	117.00	117.00	18.72	22.80
‡	*88.00*	*88/90*	*86.00*	*87.00*	*88.00*	*88/90*	*89.00*	*93.00*	*93.00*	......	......	......	......
Cincinnati	**100.00**	**108.00**	**105.00**	**105.00**	**108.00**	**115.00**	......	......	......	150.00	150.00	21.78	26.58
Cleveland	**80/81**	**81/84**	**72/74**	**80.00**	**81.00**	**84.00**	......	......	......	......	......	22.20	27.12
Dallas l	**71.00**	**71.00**	**61.00**	**59.00**	**61.00**	**66.00**	**80.00**	......	......	72.00	80.00	18.72	22.80
Denver	*101.00*	*101.00*	*110.00*	*109.00*	*108.00*	*109.00*	*103.00*	*123.00*	*129.00*	......	......	13.92	16.98
Detroit	**78.50**	**85.50**	**79.00**	**81.00**	**81.00**	**85.50**	......	......	......	......	......	21.78	26.58
	86.00	*86.00*	*91.75*	*92.25*	*91.25*	*90.75*	......	......	......	......	......	......	......
Kansas City b	**110.00**	**110.00**	**100/103**	**100/103**	**105.00**	**105.00**	......	......	......	105.00	105.00	16.56	20.16
b	*115.00*	*115.00*	*105/108*	*105/108*	*110.00*	*110.00*	*120/125*	*135.00*	*135.00*	......	......	......	......
Los Angeles a	*79.00*	*79.00*	*82.00*	*82.00*	*82.00*	*82.00*	*88.00*	*98.00*	*88.00*	......	......	13.38gh	16.26gh
Minneapolis ‡b	*111.00*	*111.00*	*111.00*	*111.00*	*111.00*	*113.00*	......	......	......	......	......	16.56	20.16
Montreal e[6]	75.00	76.00	75.00	75.00	76.00	85.00	......	......	......	......	......	......	......
	155.00	*155.00*	*155.00*	*155.00*	*155.00*	*155.00*	......	*130.00*	......	......	......	......	......
New Orleans l	**66.00**	**70.00**	**70.00**	**75.00**	**75.00**	**70.00**	*85.00*	......	......	100.00	105.00	18.72	22.80
l	*68.70*	*68.70*	*71.00*	*75.00*	*72.50*	*72.50*	*67.00*	*67.00*	*67.00*	......	......	......	......
New York ‡	**90/95**	**95/100**	**Range from $80.00 to $90.00**				**100/105**	......	......	175/200†	175/200†	22.86	27.90
‡	......	......	*Range from $97.50 to $105.00*				......	*115/120*	*115/120*	......	......	......	......
Philadelphia			**Range from $95.00 to $104.50**					......	......	171.00	171.00	22.86	27.90
			Range from $110.00 to $120.00				*110/120*	*127.00*	*127.00*	......	......	......	......
Pittsburgh l	**75/90**	**75/90**	**80/85**	**80/85**	**85/90**	**80/90**	**110.00**	......	......	......	......	22.56	27.48
l	*100/120*	*100/120*	*100/110*	*100/110*	*100/110*	*100/120*	*120/130*	*140.00*	*160.00*	......	......	......	......
St. Louis ‡j	**95.00**	**98.50**	**87.50m**	**92.50m**	**99.50m**	**107.00m**	......	......	......	......	......	18.72	22.80
‡j	......	......	*115.00n*	*115.00n*	*115.00n*	*115.00n*	......	......	......	......	......	......	......
San Francisco d	*68.00*	*68.00*	*68.00*	*66.00*	*66.00*	*65.00*	*65.00*	*65.00*	*65.00*	......	......	10.08g	12.30g
Seattle l	*62.50i*	*62.50i*	*62.50i*	*62.50i*	*62.50i*	*62.50i*	*62.50i*	*62.50i*	*62.50i*	......	......	......	......

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [3] Spruce. [6] Western Pine No. 3 Common. ‡ Delivered. *a* Yard prices. *b* Retail prices, less than CL. *c* 5 M ft. or less. *d* Direct mill prices; f.o.b. purchasers carrier or truck. *e* Tax exempt. *g* Lower rate by water shipment. *h* 50,000 lb. minimum. *i* No. 1 common. *j* Delivered in 5000 ft. lots. *k* These are retail yard prices quoted per truck load in Greater Cleveland. Less 2% for cash. Truck lots. *l* F.o.b. mill. *m* 8 to 12 ft. lengths. *n* 8 to 16 ft. lengths.

Note: Special concrete form grade Fir Plywood, 4′ by 8′ panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ⅝", $188.00; on ¾", $218.00. For other centers add rail freight increment from table on proper size. Oiling and edge sealing charges included.

† 18 ft. and under.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS		EXPLOSIVES
	Discounts from jobbers list, Jan. 16, 1946*a* Single or Double Thickness		Per lb. 40% Ammonia Gelatin in 50 lb. cases — delivered in 200 lb. lots*
	A quality	B quality	
Atlanta	76%	76%	$0.2025
Baltimore	70–10%	71–10%	.2025
Birmingham	68%	68%	.1575
Boston	......	60%*i*	.2025
Chicago	64%	64%	.2025
Cincinnati	62–10%*e*	62–10%*e*	.2025
Cleveland	62–10–10–10%	62–10–10–10%	.2425
Dallas	65%	65%	.215
Denver	66%	66%	.2075
Detroit	62-10-10%	62-10-10%	.2025
Kansas City	65–10%*e*	65–10%*e*	.2075
Los Angeles	58%	63%*f*	.21
Minneapolis	64%	64%	.2075
Montreal	40–5%*bc*	40–10–5%*bc*	18.90*h*
New Orleans	68%	68%	.2125
New York	71%	72%	.32*g*
Philadelphia	69%	70%	.2025
Pittsburgh	70%	70%	.175
St. Louis	70–10%	70–10%	.2075
San Francisco	66%	73%	.2075
Seattle	54%	55%	.21

Price of 60% Ammonia Gelatin is $0.0125 per lb. higher than 40%

Glass; a Jobbers' list price per box, 14 x 20, ss, $20.75 for A quality, $18.00 for B quality; 14 x 20, ds, $30.75 for A quality, $26.00 for B quality. *b* Discount from list, Sept. 1939; sales tax included, but 6% tax exemption not allowable for. *c* Single thickness. *e* Discount from list of Aug. 15, 1938. *f* ss; ds—62%. *i* Double thickness 65%.

Explosives; * Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g* In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $9.00 per trip. *h* F.o.b. city per 100 lb. forcite, 40%. Forcite 60%, $20.65.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.155	$0.1825	$0.2025
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.16 – .1675	.1875–.20	.2075–.22
Rocky Mtn. States	.16 – .1725	.1875–.20	.2075–.225
Pacific N. W. States	.1575–.17	.19 – .2025	.21 – .2225
Pacific S. W. States	.155 – .1625	.1875–.195	.2075–.2175

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	By Rail Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.36	....
12-in.— 2-ft. from butt	6-in.	50 to 59-ft.	.39	....
12-in.— 2-ft. from butt	6-in.	60 to 69-ft.	.43	....
12-in.— 2-ft. from butt	6-in.	90 to 100-ft.	....	.72
13-in.— 3-ft. from butt	5-in.	91 to 100-ft.	....	.73
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.43	.80
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.47	.74
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.60	.75
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	....	.76
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	.80

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie for carload lots:		6"x8"x8′		7"x9"x8′6"	
		Untr.	Tr.	Untr.	Tr.
Boston	Oak *i*	....	.....	....	.....
	Pine *i*	....	.....	....	.....
New York	S. L. Sap Pine	$1.65	$2.85	$2.00	$3.30
	Mixed Oak	1.80	3.05	2.50	3.60
Birmingham	Hardwood	1.00	1.60*a*	....	2.25*a*
Chicago	Red Oak	....	2.55/2.60*a*	....	3.25/3.40*a*
Los Angeles	Douglas Fir	....	3.00*a*	....	....
Philadelphia	Red Oak	2.33	3.13	3.10	4.25*a*
St. Louis	White Oak	2.40	....	3.07	....
	Red Oak	2.29	2.95*a*	2.97	3.90*a*
	Sap Pine or Cypress	3.07*a*	....	....	....
San Francisco	Douglas Fir	1.60*e*	2.80*f*	2.10*bf*	3.88*caf*
Montreal	Birch or Maple	....*h*	....*h*	....*h*	....*h*

Tr.— Treated; Untr.— Untreated. *a* Creosoted. *b* 7" x 9" x 8′. *c* Empty cell. *e* Green. *f* F.o.b. cars. *h* No constant price available. *i* Not available

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$4.25
Chlorine cylinders, liquid, per lb. f.o.b. works	.07–.12
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, f.o.b. works, ton	22.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.80
Soda ash, 58%, in paper bags, per 100 lb. dense	1.50
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.50
Sulphate of copper, in bags, per 100 lb f.o.b. works	8.10

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION — SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. in quantity Common backing	Straight hard	LIME Per ton, In paper, Carload lot, Hydrated finishing	Common hydrated	Pulverized, or lump
Atlanta	......	......	......	......	......	......	$25.00	$25.00	$19.00	$17.50	$17.50
Baltimore	$175.00	$190.00	$350.00	$400.00	......	......	32.00*k*	35.00*k*	30.00	20.00	...
Birmingham	97.50	104.00	195.00	231.00	......	......	20.00*ff*	22.50*gg*	24.67	18.10	.....
Boston	145.65†	155.35†	291.30†	330.15†	......	......	32.00*i*	35.00*i*	30.80†	26.40†	.....
Chicago	115.00	122.50	230.00	......	......	......	21.00	23.00	27.00	19.50	.....
Cincinnati	170.00*j*	180.00*j*	240.00*jdd*	......	......	......	34.00*j*	34.00*j*	21.40*j*	19.70*j*	.....
Cleveland	118.00*cc*	126.00*cc*	236.00*cc*	......	......	......	28.50	28.50	24.00	22.00	27.50*ee*
Dallas	......	110.00	......	......	......	......	18.75	33.25	28.00	22.00	.....
Denver	......	......	......	......	......	......	32.00	32.00	34.80*bb*	28.00*bb*	34.00*bb*
Detroit	117.08	124.88	234.15	234.15	$290.68	$332.20	30.00*cc*	31.50*cc*	30.00	28.00	28.00
Kansas City	112.00	120.00	....	......	......	......	16.00*o*	18.50*o*	36.00*p*	30.00*p*	30.00*p*
Los Angeles	*r*	*r*	*r*	*r*	*r*	*r*	20.00§	.....	.....	36.00	35.00
Minneapolis	152.00*p*	176.00*p*	317.00*p*	176.00*wp*	......	......	30.00*rp*	.....	34.50*bbe*	25.50*bbe*	34.50*bbde*
Montreal	110.00*aq*	125.00*aq*	225.00*aq*	......	......	......	25.50	37.00	12.50*ub*	14.00*ub*	.....
New Orleans	160.00	160.00	300.00	.....	......	.....	29.00	.....	38.00	26.00	37.50
New York	112.20*h*	119.60*h*	164.50*h*	179.40*hn*	......	......	33.00	.....	34.40	26.80	.....
Philadelphia	112.10	119.60	224.20	269.10	321.20	405.10	27.00	30.00	29.75	17.50	24.50
Pittsburgh	98.50	105.80	181.85	207.30	265.85	303.60	26.00	38.00*y*	20.45	18.65	2.97*m*
St. Louis	120.00	138.50	252.50	252.50	339.50	......	32.50*sl*	30.50*sl*	.80*saap*	.60*saap*	1.00*aaspee*
San Francisco	132.00*a*	148.50*a*	198.00*dda*	148.50*ta*	......	......	30.00	.....	24.95	24.95	2.49*m*
Seattle	150.00*cc*	160.00*cc*	......	160.00*ccw*	......	......	32.00	39.00	32.00*shh*	32.00*shh*	3.60*mhh*

☛ † F.o.b. *a* Smooth. *b* Per 50 lb. bags. *c* 6 x 12 x 12 in.-3 cell. *d* Pulverized hot. *e* 5% discount for cash. *g* 5½ x 8 x 12. *h* F.o.b.trucks, job site N.Y.C. *i* F.o.b. warehouse only. *j* Truck load or over. *k* $1.00 discount. *l* Red face. *m* Per bbl., 180 lb. *n* 7¾ x 7¾ x 1' Speed tile. *o* F.o.b. Buffalo. *p* Truck lots. *q* Provincial and Municipal tax extra. *r* Not used because of earthquate danger. *s* 2% discount for cash. *t* 5½ x 8 x 11½. *u* Tax exempt. *v* Sand lime. *w* 5 x 8 x 12. *y* Stacked. *z* Pebble lime price per 80 lb. sack. *aa* Price per sack. Lime not sold per ton. *bb* LCL. *cc* Truck delivery. *dd* 6 x 12 x 12. *ee* Pebble lime. *ff* 80% common. *gg* Select. *hh* LCL. § F.o.b. plant.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in 100 lb. cases In oil *w*	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *c*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f.o.b. factory Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl. per ton
Atlanta	$25.60	$33.125	$1.75	$2.70	$1.65	$2.06‡	$2.06‡	$2.06‡	$1.00‡	$36.00‡
Baltimore	25.35	32.75	2.25	3.50	2.75	2.75	3.30	3.30	.55	36.00
Birmingham	25.60	33.125	4.40	4.52	....	3.05	3.00	3.00	.48	42.00*ee*
Boston	25.35	32.75	....	....	....	....	....	2.75‡*q*	....	34.00
Chicago	25.35	32.75	....	....	....	2.82‡*u*	2.87‡*o*	2.87‡*o*	35.00‡*bbv*	38.00‡
Cincinnati	25.35	32.75	....	....	....	2.44‡	2.54‡	2.54‡	.35*y*‡	42.00‡
Cleveland	25.35	32.75	3.00	3.00*z*	3.00	2.44	2.54*o*	2.54*o*	.32*y*	38.00
Dallas	25.35	32.75	....	4.05	....	3.50*q*	3.75*q*	4.35*q*	.30	45.00
Denver	25.35	33.25	2.88	4.38	2.63	3.17*o*	3.10*o*	.....	.41*ff*	48.00
Detroit	25.35	32.75	3.24	2.72	3.60	2.32	2.41	2.41	....	35.00
Kansas City	25.35	32.875	...	....	...	3.65	3.80	...	.50	.....
Los Angeles	25.60	33.25	2.80	4.00	3.50	2.32	1.77*e*	*l*	.65	*l*
Minneapolis	25.35	33.13*m*	....	....	....	2.42*idd*	2.47*hidd*	2.47*hidd*	.42*idd*	35.00*vdd*
Montreal	.....	23.65	3.25*p*	4.20*p*	3.62*p*	3.45*t*	3.15*tf*	2.65*tf*	...	2.60*kt*
New York	25.35	32.75	3.45*y*	....	3.45*y*	2.32	2.41*o*	2.41*o*	.34*s*	35.00
Philadelphia	25.35	32.75	3.25	3.65	3.15	2.54	2.94	2.94	.37	26.00
Pittsburgh	25.35	32.75	2.00	2.40	1.90	3.00	3.10*o*	3.10*o*	.37	40.00
St. Louis	25.35	32.75	....	....	....	2.23	2.413*h*	2.413*h*	.36	36.00
San Francisco	25.60	33.00	1.80	2.75*n*	1.35	2.27*x*	3.30*aa*	....	.38*q*	.....
Seattle	25.60	33.25	2.95*m*	2.95*m*	....	3.25*mqcc*	3.35*hmcc*	....	.49*mcc*	58.58*jmcc*

‡ Delivered. Note: Red lead in oil 50c higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* 15 lb. *f* Per 432 sq. ft. *g* 50 gal. drums. *h* Per roll. 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per cwt. *l* Not used. *m* 1% discount for cash. *n* May, 1941 price. *o* Per 60-lb. roll. *p* Tax included. *q* Per 90-lb. roll. *r* F.o.b. factory Chicago. *s* ASTM Spec. D266-41. *t* Federal tax included. *u* Per 90 lb. square. *v* Per ton. *w* Price to large paint contractors is $1.25 less. *x* Mineral surfaced. *y* 55-gallon container. *z* Drums. *aa* Approximate cost per 100 lbs. *bb* Roofers coating and cement. Price per ton. *cc* LCL, truck delivery. *dd* 2% cash discount. *ee* Asphalt, in 100 lb. package. *ff* 5-gal. drums.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor Building	Heavy Const.
Atlanta	$2.50	$1.775	$2.00	$2.00	$2.00	$2.00	$2.00	$0.85	$0.95
Baltimore	3.00	2.25	2.40	2.20/2.40	2.25	2.25	2.25	1.25	1.25
Birmingham	2.25	1.80	2.15	1.75	2.20	2.00	2.25	.95	1.05
Boston	2.50	2.10	2.40	2.45	2.50	2.30	2.30	1.55	1.55
Chicago	2.40	2.35	2.40	2.35	2.40	2.35	2.35	1.70	1.70
Cincinnati	2.50	2.20	2.35	2.50	2.375	2.375	2.35	1.46	1.46
Cleveland	2.375	2.325	2.375	2.25	2.375	2.375	2.375	1.725	1.725
Dallas	2.50	2.25	2.25	2.25	2.125	2.00	2.375	1.075	1.275
Denver	2.25*b*	2.10	2.00*b*	2.15*b*	2.25	2.25	2.24	1.40	1.35
Detroit	2.50	2.20	2.40	2.40	2.50	2.40	2.40	1.575	1.575
Kansas City	2.50	2.05	2.20	2.05/2.275	2.50	2.30	2.375	1.475	1.40
Los Angeles	2.625	2.0375	2.30	1.9875	3.125	2.40	2.50	1.4875	1.4875
Minneapolis	2.25	2.05	2.175	2.00	2.35	2.21	2.25	1.45	1.45
New Orleans	2.05	1.875	2.00	1.875	1.875	2.00	2.25	.90	.90
New York	3.20*b*	2.75*b*	3.00	3.00	3.20*a*	2.50*a*	2.75*b*	1.70	1.70
Philadelphia	2.75	2.25	2.65	2.50	2.50	2.375	2.50	1.25	1.25
Pittsburgh	3.00	2.50	2.50	2.65	2.625	2.375	2.50	1.50	1.50
St. Louis	2.75	2.45	2.425	2.55	2.50	2.50	2.50	1.50	1.75
San Francisco	2.8125	2.16	2.40	2.125	2.25	2.50	2.375	1.525	1.525
Seattle	2.495	2.195	2.395	2.20	2.495	2.395	2.50	1.795	1.70
Montreal*	1.40	1.25	1.30	1.20	1.40	1.35	1.11	.94	.88

a 6 hr. day. *b* 7 hr. day. * Cost of living bonus now included in basic wage.

MEXICO CITY PRICES

In Pesos, F.o.b. City		Nov. '48	Dec. '48
Common Wages—Building (8 hr. day)	av. per hr.	.57	.57
Common Wages—Heavy Const. (8 hr. day)	av. per hr.	.75	.75
Skilled Labor Wages			
Carpenters (8 hr. day)	av. per hr.	1.25	1.25
Bricklayers (8 hr. day)	av. per hr.	1.25	1.25
Struct. Iron Workers (8 hr. day)	av. per hr.	1.50	1.50
Struct. Steel Shapes			
3"-15" x 12 meters	per ton	1,300.00	1,300.00
Reinf. Steel, Corr. Rods			
⅜" x 12 meters	per ton	1,140.00	1,140.00
½" x 12 meters	per ton	1,080.00	1,080.00
⅝" x 12 meters	per ton	1,056.00	1,056.00
¾" x 12 meters	per ton	1,020.00	1,020.00
⅞" x 12 meters	per ton	1,020.00	1,020.00
1" x 12 meters	per ton	1,020.00	1,020.00
Gravel, truck load of 3½ cu. meters			
Blue Gravel	per tr. load	32.00	32.00
Rose Gravel	per tr. load	30.00	30.00
Cement, Std. Port. (Tolteca)	per ton	115.00	115.00
Lumber			
Mex. Sacred Fir (Oyamel)	per M ft.	350.00	350.00
1st Class Pine	per M ft.	600.00	600.00
2nd Class Pine	per M ft.	500.00	500.00

ENR Skilled Average: (Bricklayers, Carpenters, Ironworkers) $2.353. **ENR Common Average:** $1.417

Personnel go farther– *by Bonanza*

R. B. POTASHNICK

GENERAL CONTRACTOR

CAPE GIRARDEAU · MO·

Mr. Walter H. Beech
Beech Aircraft Corporation
Wichita, Kansas

Dear Mr. Beech:

We are general contractors with business scattered throughout the country, and this puts some drastic demands on the time of my personnel. The Bonanza definitely has met our need for fast, safe, and dependable transportation, averaging 25 hours of flying time per month, all on cross-country work of 400 miles or more.

We use our Bonanza primarily in looking after our highway, bridge, and pipeline business, which is usually some distance from our headquarters. Looking over proposed work calls for Bonanza operation out of both good and bad, long and short fields, and in each phase the Bonanza has performed creditably.

Very truly yours,

R.B.Potashnick

R. B. Potashnick

R.B. POTASHNICK
GENERAL CONTRACTOR

Many a contractor has "converted" to Bonanza ownership for *paying* reasons. Because travel time is slashed by two-thirds, the *same* number of key men supervises *more* jobs. And with the 4-place Bonanza, you travel at any hour—whenever it's most convenient to you. The Bonanza solves breakdown problems, too, by rushing equipment to the job in minutes. Operating costs measured in pennies per mile.

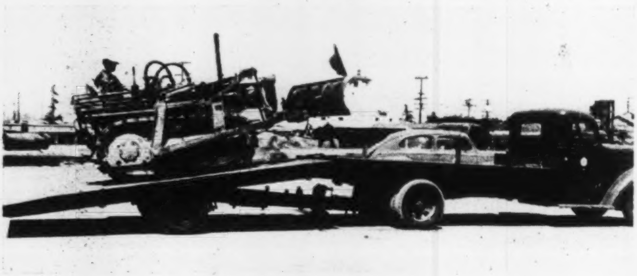
● A note on your company letterhead will bring you a 60-page brochure on "The Air Fleet of American Business." Write today to the Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

BEECHCRAFT BONANZA MODEL A35

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

NEW PRODUCTS



Tilting Type Trailer

Pictured is a unique idea in tilt type trailers, which enables a trailer and flat bed truck to be loaded with equipment in less than 12 minutes without the use of special loading ramps. There are automatic cribbing brakes to prevent movement of the trailer while loading, an automatic hydraulic tilting control cylinder to allow the trailer bed to tilt gently under loads, and loading-aid hooks placed in recesses on the truck bed to help in moving the equipment across the trailer to truck bed. Available in tandem and single axle.—FOSTER TRAILER CO., 2029 Sacramento St., Los Angeles 21, Calif.

Metal Rustproofing Agent

Kromover touch-up pencil is applied at 450 deg. F. with oxyacetylene, air-acetylene or city gas flame to rustproof metal, re-galvanize spots and for any tinning operation. Only preparation necessary is wiping off oil and dirt from metal surface with clean rag. Can be used in field by repair or installation crews.—ALL-STATE WELDING ALLOYS CO., INC., 96 W. Post Road, White Plains, N. Y.

Portable Fire Extinguisher

New 16-oz. Hero portable pressurized fire extinguisher is simple to operate by pulling trigger and aiming 18-ft. pressurized stream at fire. Fluid contains 90 percent carbon tetrachloride, 10 percent other chemicals, with carbon dioxide as propellant. Puts out gasoline, fuel oil, paper, grease, electrical and all types of incipient fires. —BOSTWICK LABORATORIES, Bridgeport 5, Conn.

Steam Hose for Pile Drivers

High pressure steam hose is specially designed to withstand deteriorating effects of a combination of steam and hot oil which occurs when lubrication is applied to pile-driving tools through steam pressure lines. Braided wire construction gives hose high bursting strength and acts as armor to withstand heavy external abuse. Constructed of a rubber core especially compounded for oil resistance, two or three plies of braided steel wire, depending upon diameter of hose, one ply of asbestos cord and a heat-resistant rubber cover. Marketed under trade name "Matchless Pile Driver Hose."—UNITED STATES RUBBER CO., Rockefeller Center, New York, 20, N. Y.

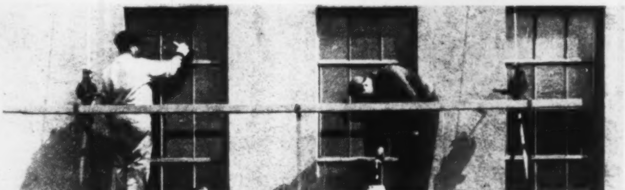
Diesel-Electric Power Plants

Two new lines include self-contained air-cooled and water-cooled units. One cylinder, four-cycle diesel engine powers the 2,500-watt plant which is characterized by its compactness, 10½ cu.ft. Electric cranking of engine is made possible by an automatic compression release. Accessories include two heavy-duty 6-volt starting batteries connected in series, two flexible fuel lines, hand crank and one extra fuel injection pump, holder and nozzle. The water-cooled plants are available in 10,000 to 35,000-watt capacities and are inclosed in sheet-steel housings with removable side panels. Both models of plant are adaptable to a wide range of portable or stationary jobs of users who must supply their own electric power.—D. W. ONAN & SONS, INC., 43 Royalston North, Minneapolis 5, Minn.

Sedgwick
WHEEL-O-MATIC
POUGHKEEPSIE PHONE 7030

All Steel Trailer

The Sedgwick Wheel-O-Matic is a new type, all-steel-constructed trailer, which features the use of a double hitch that facilitates easy parking and prevents jackknifing; also, a floating-wheel assembly that eliminates wheel shimmy under any operating condition and assures load level at all times. Road tests made by the manufacturer reveal the trailer's ability to carry a 1,000 lb. load at speeds up to 65 m.p.h., without evidence of swing or sway. The body measures 60" long, 42" wide and 12" deep. It tips the scale at 300 lb., empty.—SEDGWICK MACHINE WORKS, Poughkeepsie, N. Y.



Safety Swinging Scaffold

Designed specifically for painters and maintenance men, the new Gold Medal Midget Safety Swinging scaffold, shown above, provides safe, fast, and portable equipment. It is suspended quickly and easily from "S" or "L" hooks by means of 75 ft. of ¼-in. plow steel wire rope. The scaffold is raised and lowered by the new light, compact Midget machine which, according to the company, is light enough to be carried conveniently by one man. Midget machines have a pinion gear mechanism which assures speed in raising, and a worm and gear for smooth operation and safety in lowering. To prevent slipping or running down, the scaffold is locked at all times by the action of three steel locking pawls, a worm and gear lowering mechanism, and a safety crank handle.—THE PATENT SCAFFOLDING CO., INC., 38-21 Twelfth St., Long Island City 1, N. Y.

Underground lines need extra protection

and get it, with BYERS WROUGHT IRON PIPE

LOOK FOR THE PIPE WITH THE RED SPIRAL STRIPE

Pipe installed in tunnels faces an extra corrosion threat. Atmospheres are invariably damp at certain seasons. Moisture is alternately condensed upon, and evaporated from, the pipe wall. This means highly aggressive corrosive attack—and the only protection is in the use of a corrosion-resisting material.

In the pipe tunnel recently constructed to serve the new office and testing laboratory shop of the Nebraska State Department of Roads and Irrigation, the lines were safeguarded in a time-proven way, by installing wrought iron pipe. High and low pressure steam lines, return lines and hot water lines were all Byers Wrought Iron pipe, in sizes from 2 to 8-inches. The project was handled by H. S. Seymour, Consulting Engineer; A. W. Bohner, Construction Engineer of the Department; and P. S. Cook Co., Contractors.

The soundness of this selection is indicated by the many unusual service records established by wrought iron. In one typical instance, a 16-inch wrought iron line was installed, then relocated after 13 years of use. All pipe was found in first-class condition with the exception of one length. Analysis revealed that this failed length was NOT wrought iron. It was replaced, the rest of the original pipe re-installed, and the engineers report that after 29 years of service, no further maintenance had been required.

There is no secret as to why Byers Wrought Iron pipe serves so well—it is the result of the unique composition and structure of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and "detour" corrosive attack, and discourage pitting. The fibers also anchor the initial protective scale, which shields the underlying metal.

You will find a comprehensive review of the problems in underground services—and their successful solution—in our bulletin, "Wrought Iron for Underground Services". Ask for a copy.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, Seattle, San Francisco. Export Division: New York, N. Y.

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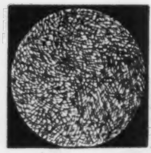
ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS



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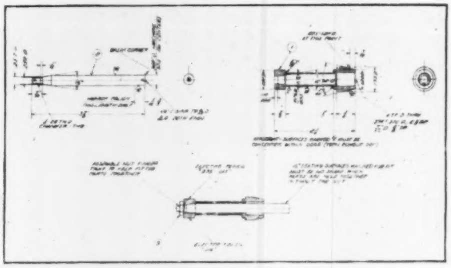

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Manufacturers' Publications

Curing and Protection—A profusely illustrated booklet explains the Sisalkraft method of curing and protection of new concrete paving work. The pictures show just how the curing blankets are used. Quickness is one of the strong points of the method. Two men can easily roll up the blankets at the rate of at least 300 or 400 linear feet an hour. The method is economical since the same paper blankets can be used over and over again. They are tough, airtight and waterproof.—THE SISALKRAFT CO., 205 W. Wacker Drive, Chicago 6, Ill.

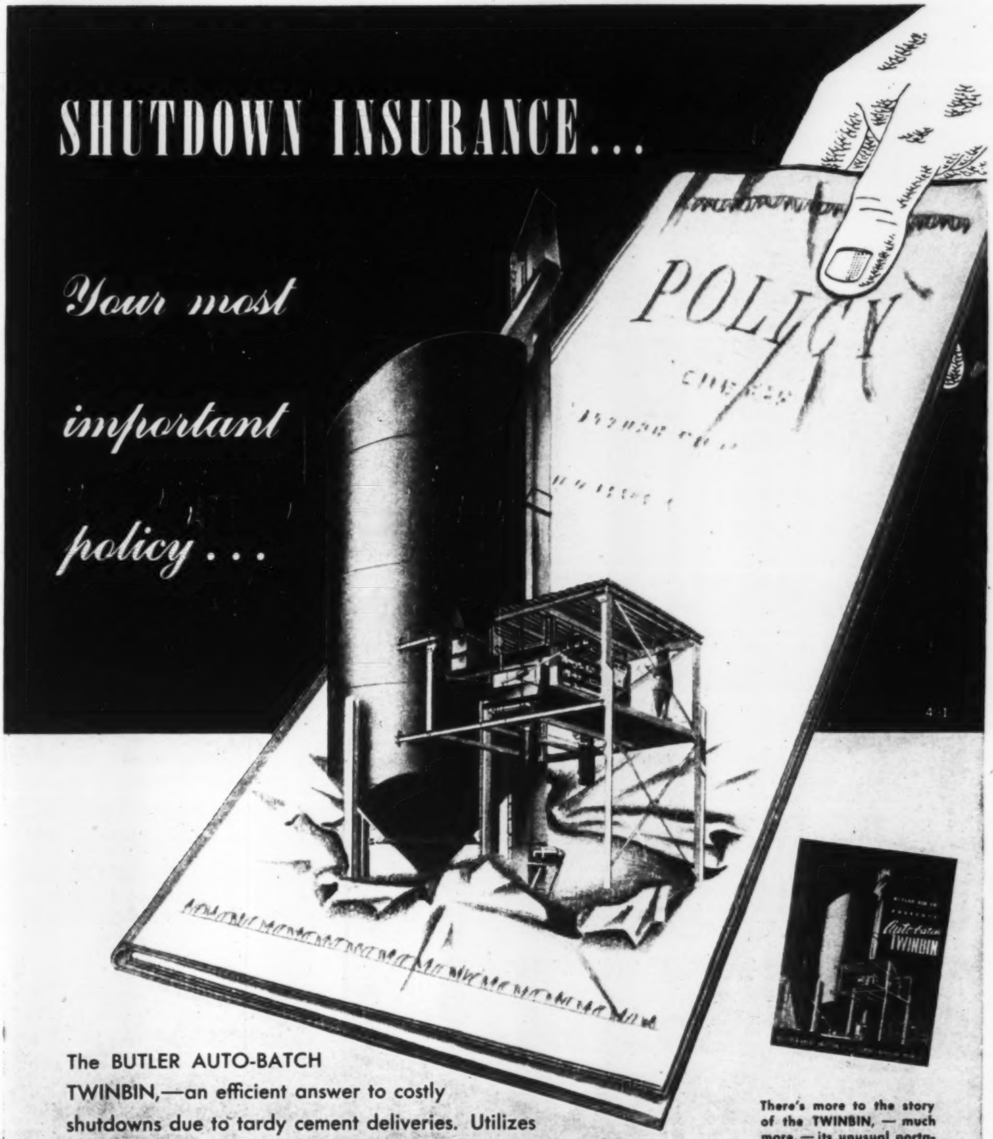
Glass Block Fenestration—(16-p. booklet) Deals with control of natural daylight through use of functional glass blocks. Describes in detail proper selection of glass block and its use for light direction and diffusion. Includes nomograph for estimating illumination levels. Topics covered include daylight control, types of functional blocks and their uses, brightness data, light transmission and distribution and a pictorial section of typical installations of functional glass block.—PITTSBURGH CORNING CORP., 632 DUQUESNE WAY, PITTSBURGH 22, PA.

Iron Cement for Pipe Joints—(6-p. folder) Describes and illustrates three methods of making bell-and-spigot joints with Smooth-On No. 5 iron cement. Tabulates quantity of cement needed for joints in pipe from 2 to 15 in. in diameter—SMOOTH-ON MANUFACTURING CO., 370 COMMUNIPAW AVE., JERSEY CITY 4, N. J.

Goggle-Cleaning Station—(4-p. folder) Describes all-metal cabinet for releasing finely atomized Sani-Spray fluid for fog-proofing and cleaning glasses and safety goggles.—ALLEN OPTICAL CO., BUFFALO 2, N. Y.

Portable Heater—(Leaflet) Uses 1½ gal. of kerosene per hour for construction and other applications requiring temporary heat. Powered by ¼-hp. electric motor, heater has collapsible canvas duct, 12 in. in diameter and 12 ft. long through which heated air is conveyed to area desired.—HERMAN NELSON CORP., MOLINE, ILL.

For Dry Walls—(2-p. folder) Describes Parge for dampproofing interior surfaces and Dilato, a sand and cement mortar, for exterior joints.—WESTERN WATERPROOFING CO., SYNDICATE TRUST BUILDING, ST. LOUIS 1, MO.

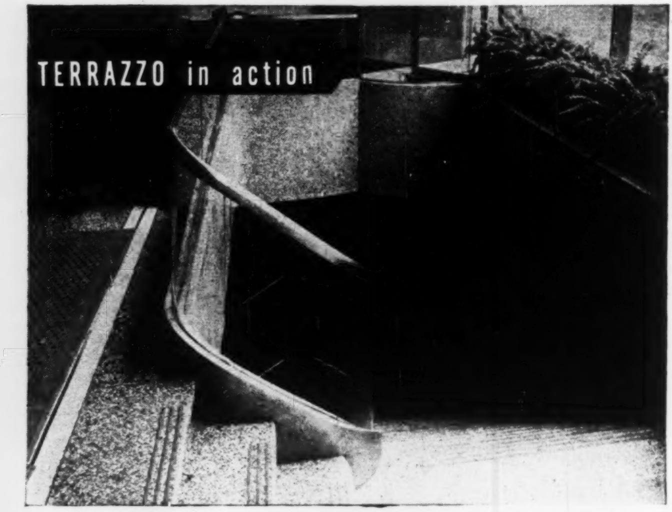


The BUTLER AUTO-BATCH TWINBIN,—an efficient answer to costly shutdowns due to tardy cement deliveries. Utilizes the space for emergency cement reserve which conventional design wastes for batcher and truck access. The principle: A two chamber bin. The upper chamber feeds to dual batcher on a platform pinned to the side. Reserve cement held in lower chamber is brought "upstairs" by elevator when needed. Capacity: 520 barrels. Production: 2 batches every 65 seconds. Result: Continuous operation even when there are delays in spotting that hopper-bottom car.

There's more to the story of the TWINBIN, — much more, — its unusual portability for example. Complete details are yours for the asking. Just write today for the BUTLER TWINBIN Bulletin.

BUTLER BIN CO.
WAUKESHA, WISCONSIN

TERRAZZO in action



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Manufacturers' Activities

Sales—Four new district sales representatives for R. G. LE TOURNEAU, INC., of Peoria, Ill., are: Steve A. Batorson, northeastern U. S. and eastern Canada; F. W. Duke, lower New York state, upper New Jersey, Pennsylvania and Maryland, M. B. Crowley, Virginia, West Virginia and North and South Carolina; and James Sevick, Oklahoma, Arkansas, Mississippi, Louisiana and Western Tennessee . . . John E. Wells is special sales representative of the newly-formed industrial parts division of REYNOLDS METALS CO. . . . Harry Crump is assistant to the sales manager of CARBOLOY CO., INC., Detroit . . . D. J. Carroll Copps is manager of the Joplin, Mo., district sales office of ATLAS POWDER CO., succeeding R. E. Caskey, now adviser on explosive sales in the midwest. John F. Flippa is manager of the Chicago district . . . R. C. Brown is director of sales for FOOTE BROS. GEAR AND MACHINE CORP., Chicago . . . Philip H. Clapp Jr., is sales manager of the engineered castings division of the AMERICAN BRAKE SHOE CO. . . . PENNSYLVANIA REFINING CO. has established a national sales organization for PENN DRAKE GUMONT, fuel system cleaner . . . Russell L. Jessee is central states sales manager for GEDNEY ELECTRIC CO. at Chicago.

Distributors—WILKINSON & MCCLEAN, LTD., Calgary, Edmonton and Lethbridge, Alta., have been appointed distributors for BUCYRUS-ERIE blast hole drills and bit dressers . . . The following have been made distributors by the CONCRETE TRANSPORT MIXER CO.; W. W. WILLIAMS CO., Columbus, Ohio, for Ohio and Kenton, Campbell and Boone Counties, Ky.; CAPITAL EQUIPMENT CO., Harrisburg, Pa., for several counties in middle eastern Pennsylvania; and the F. S. RAY CO., Houston, Tex., for 35 counties in southeastern Texas.

Personalities—Charles E. Wuerpel, former chief of the concrete research division of the Army Engineer Corps, is technical director of MARQUETTE CEMENT MFG. CO. . . . Robert L. Halsted is manager of the ALLIS-CHALMERS, Cleveland, Ohio, district office . . . Walter H. Stillner is vice-president of merchandising and Elmer H. Wavering vice-president of product design for MOTOROLA, INC. . . . Richard S. Jay is district manager of GAR WOOD INDUSTRIES, INC., for the lower

Above photos show New Holland Double Impeller Breaker installation at Hudson Stone Products Company; also . . . actual size material as it comes from delivery conveyor before screening. Notice uniformity of shapes and sizes. This is the result of "Dual Impact" action! Breaking force evenly distributed assures accurate sizing without irregular shapes—even with slabby material!

"Crush more material to desired size with less power"

says
TOM HUDSON, owner,
Hudson Stone Products Company,
Lynchburg, Ohio

● Early in 1947, Tom Hudson modernized his plant. He replaced three units with a single New Holland Model 3030 Double Impeller Breaker.

From the layout of his plant which is indicated above, you can easily see what Mr. Hudson means when he says . . .

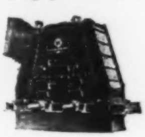
"A one-crusher plant can be successfully built around this crusher (the New Holland Double Impeller Breaker) . . . which permits a minimum of other equipment . . . contributes materially toward low maintenance."

In pits and quarries all over the world, "Dual Impact" action is producing outstanding results.

The record is the same . . . higher production at lower cost . . . in limestone, basalt, granite, gravel, and many other types of stone.

New Holland Double Impeller Breakers are available in four sizes—1212, 2020, 3030, 5050—to meet your requirements. They can be adapted easily to either an open or a closed circuit.

Whatever your crushing problems—bring them to New Holland engineers. They will help you as they have helped so many other operators. Write Department **E-19** today.



NH

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NEW HOLLAND MANUFACTURING COMPANY, MOUNTVILLE, PA.

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PRECISION
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peninsula of Michigan and the province of Ontario . . . Leonard H. Loufik has been appointed industrial manager of the central district for Westinghouse Electric Corp., succeeding C. H. Weaver, named manager of the atomic power division . . . Harrison L. Gonnerman is assistant to the vice-president for research and development of the Portland Cement Association and Hubert Woods is director of research for the association . . . Albert L. Entwistle has been elected a director and vice-president in charge of the plywood division of the Mengel Co., Louisvillle, Ky. . . . E. S. Wright has been promoted to manager of construction of the chemical plant division of Blaw-Knox Co. and W. F. O'Neill succeeds Mr. Wright as general superintendent of construction . . . W. A. Ridpath has been appointed manager of the Philadelphia plant of Joseph T. Ryerson & Son, Inc., steel distributors, to succeed C. L. Hardy, recently elected assistant vice-president with headquarters in Chicago.

Deceased—George W. Shous, 55, manager of the crusher section of the Allis-Chalmers Mfg. Co.'s basic industries department, died Nov. 29 at Oslo, Norway . . . Howard H. Leh, 59, vice-president and general manager of the Keystone Portland Cement Co., Nazareth, Pa., died Dec. 5 in Allentown, Pa. . . . John S. Oursler, 80, who retired as vice-president of Carnegie Steel Co. in 1930, died recently . . . Herbert L. Sears, 37, vice-president of the C. Daniel J. Zimmerman Architectural and Engineering Co., Indianapolis, Ind., died Dec. 20 . . . Wm. R. Wilson, president of Conklin & Harrington, Inc., and treasurer of the Good Roads Machinery Co. of New York, Inc., died in New York, Dec. 2 . . . John C. Brady, 56, president of the Fowler Skylight Corp., died at Lexington, Ky., Dec. 8 . . . George A. Brinke, 58, part owner of the American Mosaic & Tile Co., Louisville, Ky., for the last 18 years, died in that city, Dec. 10.

Miscellany—Reynolds Metals Co., Louisville, Ky., has formed an industrial parts division, and A. W. Pingel has been appointed industry manager . . . Ranney water installations are now available to municipalities and industries in the eight western states. The installation is not only a production unit but permits recharging and the building up of an underground water reserve. Headquarters, 811 W. 7th St., Los Angeles, Calif . . . Joseph T. Ryerson & Son, Inc., have started a large addition to their Chicago plant to provide 118,000 sq. ft. of modern plant and office space. Offices of the company's concrete reinforcing bar department will be moved to the new building . . . Rockwell Mfg. Co.'s Pittsburgh Equitable Meter and Nordstrom Valve divisions will be located at 25 Beale St., San Francisco 5, Calif., and 1102 Delano St., Houston 1, Tex. . . . Wheelco Instruments Co., Chicago, has opened a new district office at 2204 Fannin St., Houston 5, Tex., under the direction of George Hatfield . . . The services of the Layne-Minnesota Co., Minneapolis, and the General Filter Co., Ames, Iowa, will be handled in Minnesota, North and South Dakota and Montana, by the Minneapolis company, which specializes in locating and developing ground water supplies, while the Ames company constructs and erects all kinds of water treatment facilities for municipal, industrial, and household use . . . The Ustrac Corp., Warren, Ohio, recently shipped a carload of tractors to India . . . The Associated Locksmiths of California has awarded a certificate of merit to the Yale & Towne Mfg. Co., Stamford, Conn., division, for the creation of a three-way cabinet lock, which serves the same purposes for which three different ordinary locks are required . . . Special recognition was given to L. Grossman Sons, Inc., Quincy, Mass., by the National Retail Lumber Dealers' Association. The award was won largely on civic activities fostered and engaged in by members of the company, for its work in providing housing, and for employe relations . . . An ultrasonic "stethoscope" that enables engineers to examine solid pieces of steel by means of sound waves has been devised by the Westinghouse Electric Corp. to assure flawless quality in their giant electric generators, H. C. Amtsberg, manager of metallurgical engineering at East Pittsburgh, Pa., has announced.

N. C. Section, A.W.W.A.

R. W. Luther, assistant director of the municipal water department at Elizabeth City, N. C., was elected chairman of the joint conference of the North Carolina Section of the American Water Works Association and the North Carolina Sewage Works Association at their 28th annual meeting at Asheville, N. C., Nov. 8-10. He succeeds W. M. Franklin of Charlotte. Other officers elected are: E. R. Tull of Rockingham, vice-chairman; E. C. Hubbard of Raleigh, secretary; George S. Rawlins of Charlotte, director of the F.S.W.A.; D. M. Williams of Durham, director of the A.A.W.A.; and George Moore of Albemarle, director on the national board of directors. Some 200 officials and engineers of water and sewer departments in the state attended.

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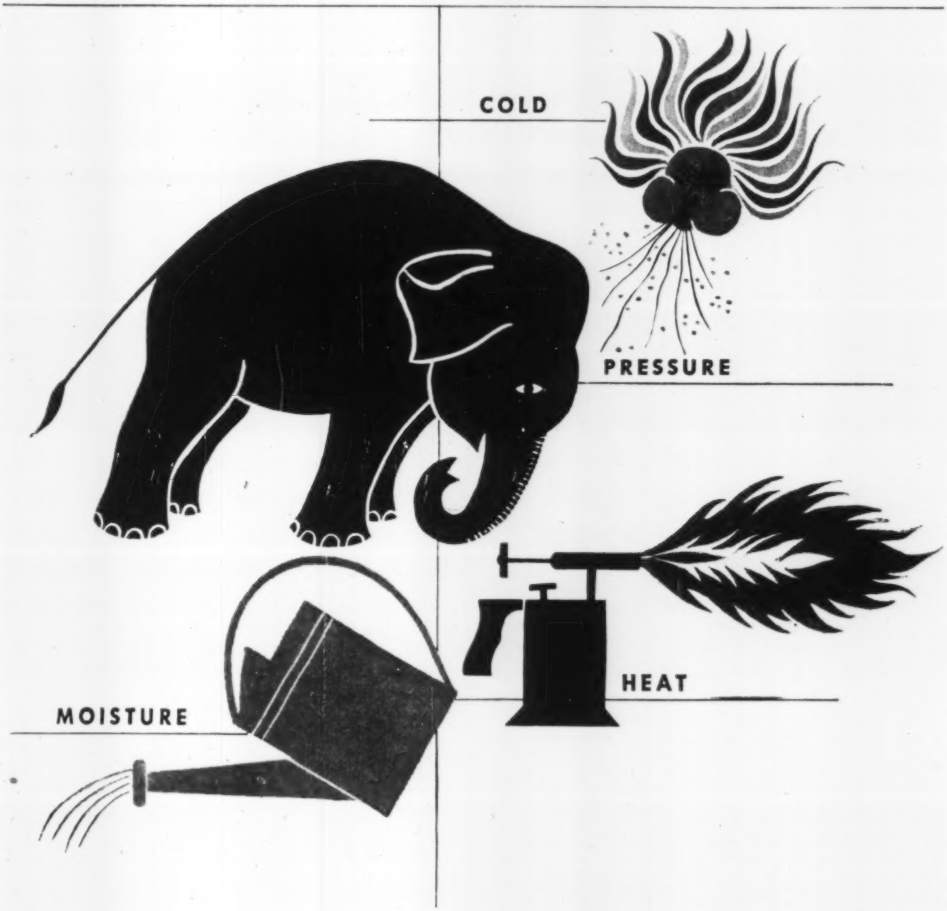
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Men and Jobs

First Lieut. Milton Albert Strain, who is in the U. S. Army Corps of Engineers at McDill Air Force Base, Fla., has received a Rhodes Scholarship award. He was graduated from the U. S. Military Academy in 1946.

Howard O. Akers, assistant superintendent of Washington, D. C., buildings, was promoted to superintendent recently, replacing **Edward P. Brooke,** who is completing 44 years in the District service. Mr. Akers has been with the District government for 40 years.

A. S. Marvin is division engineer in charge of the Pittsburgh, Pa., engineering department of the American Bridge Co. A graduate of the University of Colorado, 1924, Mr. Marvin joined the company as a draftsman at the Gary plant. He later became a designing engineer in the Chicago division office. **C. H. Scranton** has been named assistant division engineer. A graduate of the University of Cincinnati 1936, Mr. Scranton joined the company in 1937 at the Ambridge, Pa., plant.

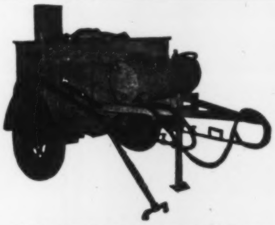
Henry C. Moore, Seattle, Wash., planning consultant, has been named planning engineer for the City-County Planning Board at Winston-Salem, N. C. Holder of degrees from Massachusetts Institute of Technology and the University of Michigan, he was planning consultant with the National Housing Agency during 1946-47. From 1940 to 1944 he was planning engineer for the Fairfax, Va., County Planning Commission.

Prof. J. S. Dodds of Iowa State College has been elected chairman of the Iowa State Board of Engineering Examiners for 1949.

Paul J. Mahoney, for the last three years engineer of Pottawattamie County, Iowa., has resigned.

Fred W. Talbot, for many years resident engineer of the Peninsula State Park, Erie, Pa., is being transferred to Harrisburg where the state is setting up a central engineering bureau for its parks and other public projects.

Walter Mybeck, new director of the Indiana State Division of Public Works & Supply, has announced the appointment of **Stacy H. Dismore** of Scottsburg, Ind., as assistant director.



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FLEXCO H D RIP PLATES are used in repairing rips and patching conveyor belts. Their use saves expensive replacements and extended shutdowns.

FLEXCO H D BELT FASTENERS make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Six sizes in steel and alloys.

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Elections and Activities

Albert B. Goodwin, engineer in charge of the Asheville, N. C., office of the United States Geological Survey, has been appointed president of the Asheville sub-section of the American Society of Civil Engineers, succeeding Joseph A. Lieberman of the Southeastern Forest Experiment Station, who has moved to another section. Max Mitchell, also of Asheville, has been re-elected secretary-treasurer of the Asheville sub-section, affiliated with the Tennessee Valley Section of A.S.C.E.

The Engineers Club of Washington, D. C., has elected Frank J. Hanrahan president for 1949. He is chief engineer of the National Lumber Manufacturers Association.

Joseph G. Moretti, Miami, Fla., is president of the Builders Association of South Florida. He succeeds Emil J. Gould. Other officers are Ray Fleming, vice-president, Jack Kagey, secretary-treasurer, and George S. Miller, executive secretary.

Floyd Andrus has been elected president of the Erie County, Pa., Home Builders Association. Other officers are Gustav Bertelsen, vice-president; H. E. Thompson, secretary, and Arthur E. Reichel, treasurer. Directors are Julius Schaaf, Harry Baughman, John Nies, A. D. Weiler, R. B. Way, Cyril Sullivan and Lawrence Nolan.

L. B. Clore, Crawfordsville, has been elected president of the Indiana Sewage Works Association, with Charles Romeiser, Auburn, named vice-president of the north section, and Ross Buck, Bloomington, vice-president of the south section.

Arthur S. Langenderfer, Toledo, is the newly-elected president of the Ohio Contractors Association, succeeding V. N. Holderman, Columbus, retiring president. Francis F. Smalley, Dayton, was elected vice-president; Col. Charles E. McKee, Columbus, renamed executive secretary; and Wayne T. Geissinger, Columbus, renamed labor relations counsel. Besides Langenderfer and Smalley, trustees elected were: Paul F. Hollinger, Akron; Elmer O. Vogt, Massillon; Harry B. Fenton, Ashland; Gordon Brode, Newcomerstown; Glenn W. Maxon, Dayton, Ralph O. Perrott, Findlay; William E. Ringwald, Jr., Chillicothe; Henry J. Fauber, Ashland; A. J. Baltes, Norwalk, and C. P. Calaway, Toledo.

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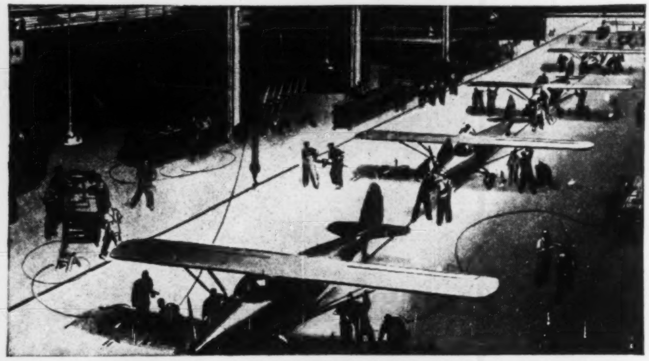

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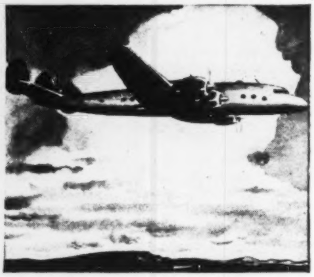

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New Engineering Books

(*Continued from page 80*)

PARKING FOR SMALLER CITIES. 138 pp. Associated Retailers of Indiana, 808 State Life Building, Indianapolis, Ind. $2.50.

PROCEEDINGS OF THE NATIONAL ANNUAL MEETING FOREST PRODUCTS RESEARCH SOCIETY, 1948—Volume Two—495 pp. Forest Products Research Society, Box 2010 University Station, Madison 5, Wis. $8.

Reports and Pamphlets

1948 PROCEEDING OF THE NINTH ANNUAL HIGHWAY ENGINEERING CONFERENCE—Bulletin No. 38—Vol. 39, No. 8. University of Utah Engineering Experiment Station, Dept. of Engineering, Salt Lake City, Utah.

1948 PROCEEDINGS OF TWENTY-FOURTH ANNUAL CONVENTION OF THE ASSOCIATION OF HIGHWAY OFFICIALS OF THE NORTH ATLANTIC STATES—The Association of Highway Officials of the North Atlantic States, Office of the Secretary, State House, Trenton, N. J.

1948 SYMPOSIUM ON MINERAL AGGREGATES — Special Technical Publication No. 83. American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. $3 per copy; cloth binding, $3.65.

WIND TUNNEL TESTS OF SUSPENSION BRIDGE SECTION MODELS—By F. J. Maher, D. Frederick, E. R. Estes, and D. B. Steinman. Engineering Experiment Station Series No. 69. Virginia Polytechnic Institute. $1.

ACI STANDARDS—1948—American Concrete Institute, New Center Bldg., Detroit 2, Michigan. $2.

FACTS ABOUT DOUGLAS FIR PLYWOOD—Douglas Fir Plywood Association, Tacoma 2, Washington.

HOUSING AND EMPLOYMENT—New Series, No. 8. Published by the International Labour Office, Geneva, Switzerland. 3s. 9d. ($.75).

BETONPROPORTIONERING — By Niels M. Plum, Dansk Selskab for Bygningsstatik, Copenhagen, Denmark.

BUILDING EXITS CODE—Ninth Edition, 1948—National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass. $1.

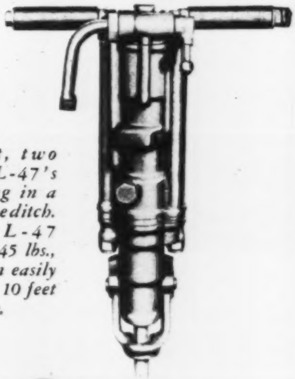
TYPES OF ROAD SURFACING AND MAINTENANCE USING TAR OR ASPHALTIC BITUMEN—Road Note No. 5—British Department of Scientific and Industrial Research Road Research Laboratory. His Majesty's Stationery Office: London. Price 1s.

PRICE LIST OF AMERICAN STANDARDS—Industrial Standardization—Part II. American Standards Association, Inc., 70 East 45th St., New York 17, N. Y.

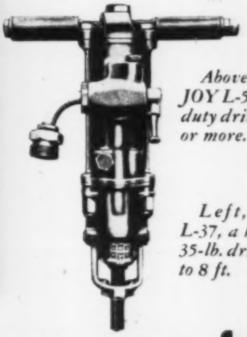
SAFEGUARDING HIGHWAY REVENUES—National Highway Users Conference, Washington, D. C.

REPORT OF COMMITTEE ON LIME-SOIL STABILIZATION—Technical Bulletin No. 147. American Road Builders' Association, 1319 F St., N.W., Washington, D. C.

Left, two JOY L-47's working in a pipe-line ditch. The L-47 weighs 45 lbs., and can easily drill to 10 feet or more.



Above, the 55-lb. JOY L-57, for heavy-duty drilling to 15 ft. or more.



Left, the JOY L-37, a hard-hitting 35-lb. drill for depths to 8 ft.

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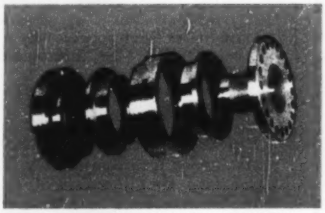

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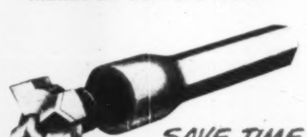

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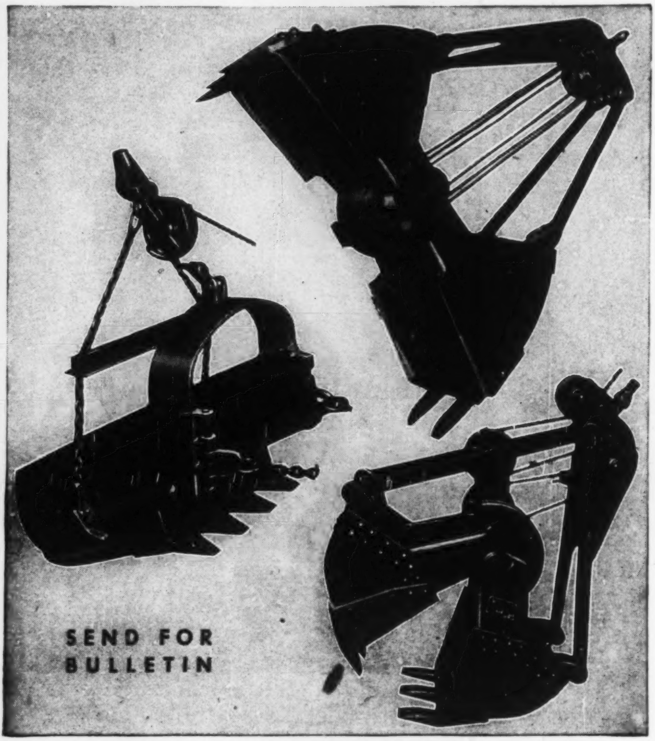

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THE EFFECT OF MIXING ON THE ASPHALT CONTENT OF PAVING MIXTURES—Technical Bulletin No. 152—American Road Builders' Association, International Bldg., Washington 4, D. C.

RENTAL HOUSING: DIRECT INVESTMENT BY INSURANCE COMPANIES AND BANKS—A LIST OF SELECTED REFERENCES. Housing and Home Finance Agency Washington, D. C.

CAREERS IN ENGINEERING AND SCIENCE. Polytechnic Institute of Brooklyn, N. Y.

TRAFFIC SURVEY OF MONROE METROPOLITAN AREA, 1947—By Louisiana Department of Highways and Local Governmental Units, Baton Rouge 4, La.

LARGE AIRPORT LIGHTING AND DISTRIBUTION—DESIGNED TO MEET CAA AND AN STANDARDS. Available upon request from the Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh, Pa.

AMERICAN INDUSTRY AND THE COLLEGES OF ENGINEERING. Rensselaer Polytechnic Institute, Troy, N. Y.

FIRE RESISTANCE OF STRUCTURAL CLAY TILE PARTITIONS—Building Materials and Structures Report BMS113. United States Department of Commerce. Superintendent of Documents, Washington 25, D. C. Price 15c.

A SURVEY OF PUMPING IN ILLINOIS—Research Reports No. 1 D—Highway Research Board, Washington 25, D. C.

POWER IN NEW ENGLAND—A Report of the Power Survey Committee of the New England Council, Statler Bldg., Boston 16, Mass.

SPILLWAY DESIGN FOR WHITNEY DAM BRAZOS RIVER, TEXAS — Technical Memorandum No. 2-263—Waterways Experiment Station, Vicksburg, Miss. Price $1.

NEBRASKA HIGHWAY NEEDS—AN ENGINEERING APPRAISAL, 1948—Automotive Safety Foundation, 700 Hill Building, Washington 6, D. C.

SIMPLIFIED GRAPHICAL DISTRIBUTION OF MOMENTS IN RIGID FRAMES—By A. A. Eremin, 1541-37th St., Sacramento 16, Calif. $3.

Also Recorded

Popular President–Some time ago a new bridge near Kansas City, Mo., was named after President Truman. Now "Truman Road" has been officially designated as the new name for 15th Street, one of the main east-west arteries in that city, and in Key West, Fla., a street has just been renamed "Truman Street".

High Jinks–Two workers employed by the Chris E. Jensen Co., St. Paul, Minn., in the construction of a soybean elevator for the Glidden Co. in Indianapolis, Ind., gave onlookers and police something to worry about. The men had turned a 72-ft.-high catwalk into an unlicensed bar, flourishing their bottles and cavorting on the high structure. The police ordered the men to come down, but they only jeered and refused to do so until the police went away. Finally the pair came down and were promptly fired.

OBITUARY

Maj. James Warner Cannon, 66, right-of-way engineer for the Delaware State Highway Department in Kent County, Del., for the last 25 years, died on Dec. 21 in Milford, Del.

Edward B. Plant, 68, who retired from the Canadian Pacific Railway in 1946 as consulting engineer, died at Montreal, Dec. 16. He entered the C.P.R. service in 1907.

Charles H. Uthe, 65, chief engineer and designer for the Parson Engineering Co., Cleveland, died Dec. 14.

Philip S. Cotton, 41, structural engineer for Jackson and Moreland Co. of Boston, died in Wollaston, Mass., Dec. 19. He was a graduate of Northeastern University.

John Carter McCalmont, 49, engineer for the Navy Department's Bureau of Aeronautics for 25 years, died Dec. 18 in Washington. He was a graduate of the University of Michigan.

Edgar V. Smith, 68, who served two terms as Allen County, Ohio, surveyor, and was deputy in the engineer's office from 1909 until 1946, died Dec. 19 in Lima.

Frank C. Arn, 67, Westerville, Ohio, contractor, died Dec. 19. He was general building superintendent at Camp Sherman during World War I and served as an Army engineer during World War II.

Oscar Von Voightlander, 71, a civil and mechanical engineer with the Fargo Engineering Co. of Austin, Tex., died recently as the result of an automobile accident. After service in the Spanish-American war he entered Stevens Institute of Technology where he was graduated in 1905. He then joined the J. G. White Engineering Corp., New York, in the design and construction of power plants. He was design engineer on the construction of the Fraser, Iowa, power plant of the Ft. Dodge, Des Moines and Southern Railroad. In 1907 he took an instructorship in theoretical mechanics at Union College, Schenectady, N. Y., while studying for his master's degree in civil engineering. In 1910 he was with the Board of Transportation, New York City. In the first world war he was a captain in the Corps of Engineers. Subsequently he was connected with a number of important companies and was engaged chiefly in the design of power plants.

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ELSIE EAVES, Manager   J. A. MAHONEY, Reports   E. R. BIGGERSTAFF, M. R. ROESSLER, Statistics

WATER SUPPLY

Ala., Demopolis—City, exten. distr. sys. **$125,000.** Donald Mills, Box 534, Selma, consult engr.

Ill., Germantown — Village, Ben G. Albers, clk., WW extens., imprvs., sewer extens. **$150,000.** Caldwell Engr. Co., Jacksonville, engr. CD 12/3.

Ind., Butlerville—State Dpt. Procurement & Supply, O. M. Heslar, dir., State House, Indianapolis, WW imprvs., feeder mains, 300,000 gal. elevated steel tank, **$250,000.** O. M. Leonard & Assoc., 232 Franklin St., Michigan City, engrs.

Ind., South Bend—Bd. P. Wks., Mayme Dumont, secy., City Hall, WW imprvs., incl. 7 m.g. rein.-con. reservoir, 24 in. c. i. pipe feeder main, supply mains, 2 well, South Side booster station, **$950,000.** Chas. W. Cole & Son, 220 W. LaSalle St., consult. engrs. CD 4/14—ENR 4/29.

Minn., Moorhead—City, P. Service Comn., J. E. Young, supt., water treatment plant, warehouse, **$150,000.** Foss & Co., Moorhead, engrs.

Mo., Fulton—City, City Hall, voted **$300,000** bonds, water and light plant imprvs. Burns & McDonnell, 95 and Troost Sts., Kansas City, Mo., consult. engrs CD 11/18—ENR 12/9.

N. Y., Gates—Town, water sys., imprvs., tank and 8 in. main. **$285,000.**

N. C., Sylva—Town, WW imprvs. **$125,000.** John J. Harte Co., Forsyth Bldg., Atlanta, Ga., consult. engr.

N. D., Grafton—State Bd. Admin., Bismarck, developing water supply. **$300,000.**

Tex., Beaumont — City, voted bonds, c.i. waterlines replacements only, **$175,000;** c.i. waterline crossing for Brakes Bayou, **$50,000;** erecting steel water tank and tower west side of city, **$150,000;** addnl. c.i. waterlines various sects. of city, **$431,972;** c.i. lines in newly incorporated or to be areas, **$143,028.** Freese & Nichols, 407 Danciger Bldg., Fort Worth, consult. engrs.

Tex., Conroe—City, John L. Griffith, secy., water distr. sys. **$140,000.** H. G. Olmsted, Conroe, consult. engr. CD 9/21—ENR 10/14.

Tex., Eagle Pass—City, C. O. Williams, mayor, c.i. pipe extens., sys. rehabilitation, **$176,000;** addnl. mains and distr. sys. imprvs., **$150,000;** filtration plant, **$200,000.** Terrell Bartlett Engineers, Transit Tower, San Antonio, consult. engrs.

●**Tex., Fort Worth**—City, W. O. Jones, mgr., bond election Jan. 25, low lift pump station at Holly Plant, **$250,000;** 30 m.g. filter extens., **$600,000;** 20 m.g. sedimentation basin at Holly Plant, **$350,000;** aeration facilities for water, **$100,000;** chlorination facilities, **$100,000;** 36 in. watermain from Holly Plant to West Side Pumping Plant, **$340,000,** Freese & Nichols, 407 Danciger Bldg., consult. engrs.; 36 in. watermains from Holly Plant to Bluff and Houston Sts., **$200,000,** J. J. Rady, 811 Insurance Bldg., consult. engr. Uel Stephens, water supt. c/o owner, CD 11/10—ENR 12/9.

●**Tex., Sweetwater**—City, voted bonds, rein.-con., earth, water retention dam on Oak Creek in Coke Co., **$1,900,000;** 30 mi. probably 22 in. water supply line between dam and city limits, **$600,000.** CD 6/18—ENR 7/8.

Utah, Orem—Town, c/o O. E. Pyne, recdr., voted bonds, 2 m.g. rein.-con. reservoir, 15 in. flow line and 7,200 ft. 12 in. pressure main. **$175,000.** L. V. Beckman, city engr. CD 9/28—ENR 10/14.

SEWERS, WASTE DISPOSAL

Calif., Los Angeles — Bd. Supervs. Los Angeles Co., 501 Hall of Records, sanitary sewers in Sinaloa Ave. **$218,000.** C. E. Arnold, co. engr.

Calif., Los Angeles—Bd. Supervs. Los Angeles Co., 501 Hall of Records, sanitary sewers in Santa Rosa Ave., Altadena, **$241,200;** Brandon St., Pasadena, **$152,800;** Mooney Dr., Garvey, (C.I. 1279), **$286,700,** C. E. Arnold, co. engr.

Fla., Bartow—City, sanitary sewer imprvs. Over **$100,000.** Russell & Axon, Box 1431, Daytona Beach, consult. engrs.

Ga., Augusta—City, sanitary sewer imprvs. **$225,000.** Patchen & Zimmerman, Daniel Field, Augusta, consult. engrs. CD 10/27—ENR 11/11.

Ga., Augusta—Richmond Co., sewage disposal facilities to serve Fleming School community. Over **$300,000.** Wiedeman & Singleton, C. & S. National Bank Bldg., Atlanta, consult engrs.

Ill., Gibson City—City, Edward P. Bergstrom, clk. defeated **$120,000** bonds, sewage disposal plant, connecting sewerage sys. **$250,000.** Warren & Van Pragg, Inc., 253 S. Park St., Decatur, engr. CD 7/31/47—ENR 8/21/74.

Kan., Kansas City—City, City Hall, sewer in 12 sub sewer districts, **$100,000.** Truman Schlup, 1401 Fairfax Trafficway, Kansas City, Kan., consult. engr. J. O. Armstrong, city engr. CD 3/21/46.

Kan., Liberal—City, City Hall, voted **$175,000** bonds, sewage plant Wilson & Co., 223 N. Santa Fe St., Salina, engrs. CD 12/1.

●**Mich., Lansing**—City, Dpt. P. Serv., City Hall Annex, Zone 7, sewage and garbage disposal plant, **$3,500,000.** Drury, McNamee & Porter, Ann Arbor, consult. engrs. Glenn P. Manz, city engr. CD 8/1/45—ENR 8/9/45.

Mo., Ferguson (St. Louis, Zone 21, P. O.)—City, Radah B. Becker, clk., City Hall, 11 Church Rd., defeated **$849,000** bonds, storm water sewerage sys., extens., imprvs. Project indefinitely postponed. CD 12/1.

Mo., North Kansas City—City, Lee Roberts, mayor, City Hall, plans bond election storm and sanitary sewers, incl. Proj. 1, sewers in 19 Ave., North Park Addn., eastward to join 18 Ave. sewer; Proj. 2, sewers 26 Ave. west to Missouri River, **$700,000.** Charles A. Haskins, Finance Bldg., Kansas City, Mo., engr.

Mont., Billings—City, City Hall, sewage plant. **$300,000.** Black & Veatch, 4706 Broadway, Kansas City, Mo., engrs.

Neb., McCook—City, sewerage sys. imprvs. **$207,656.** Paul Mousel, 3316 S. 29 St., Lincoln, consult. engr. CD 12/19/45—ENR 1/10/46.

Neb., North Platte—City, sewerage sys. imprvs. **$350,000.** Bruns & McDonnell, 95 and Troost Sts., Kansas City, Mo., consult. engrs. CD 8/22/46—ENR 9/5/46.

N. Y., Albany—City, sewer constr. program, providing flood relief during storms. **$300,000.**

●**N. Y., Union**—Town, sewerage sys., treatment plant for Endwell area. **$1,200,000.**

Ore., West Salem—City, City Hall, sewage disposal plant, **$44,000;** sys. **$156,000.** Cornell, Howland, Hayes & Merryfield, Rennie Bldg., Corvallis, consult. engrs. CD 8/25/45—ENR 8/23/45.

Pa., Phila.—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, plans by G. Pepper, Jr., 225 S. 15 St., sewage disposal sys. for Phila. (Byberry) State Hospital. **$350,000.** A. F. Jones, c/o owner, ch. engr.

Pa., Plymouth—Plymouth Boro, W Shawnee Ave., sewage treatment plant. **$250,030.** Clyde Potts, 30 Church St., New York, N. Y., consult. engr. A. G. Kostendauder, Gaylord Ave., engr. CD 1/12/45—ENR 1/25/45.

Pa., Shenandoah—City, interceptor sewerage sys. **$700,000.** Gannett, Fleming, Corddry & Carpenter, 600 N. 2 St., Harrisburg, consult. engrs.

Tenn., Chattanooga — City, rising 3 sanitary sewer lines affected by raising Hales Bar Dam, **$375,000.** Marion Boriss, city engr. CD 4/13—ENR 4/29.

Tex., Conroe—City, John L. Griffith, secy., sanitary sewer collection lines, **$200,000.** H. G. Olmsted, Conroe, consult. engr. CD 9/21—ENR 10/14.

●**Tex., Fort Worth**—City, W. O. Jones, mgr., bond election Jan. 25, sanitary sewers, **$3,000,000;** sewage treatment **$2,600,000.** CD 9/22—ENR 10/14.

Tex., Junction—City, Joe Bissett, mayor, sewage disposal plant, **$60,000;** sanitary sewer collection sys., **$60,000.** Mitchell & Hunt, Transit Tower, San Antonio, consult engrs.

Tex., Stephenville—City, R. N. Pittman, mgr., sewerage sys., sewage treatment plant, **$225,000.** Freese & Nichols, 407 Danciger Bldg., Fort Worth, consult. engrs. CD 9/9—ENR 9/30.

Utah, Kanab—Town, Mrs. Marie McDonald, recdr., sanitary sewerage sys., disposal plant. Approx. **$100,000.** R. G. Harding, Utah Savings & Trust Bldg., Salt Lake City, consult. engr. J. Mark Holmes, town engr.

Utah, Pleasant Grove—Town, c/o Harold H. Bullock, recdr., defeated bonds, sanitary sewerage sys., disposal plant. **$310,000.** Caldwell, Richards & Sorensen, Templeton Bldg., Salt Lake City, consult. engrs. CD 11/1/45—ENR 11/29/45.

Wash., Burlington—City, City Hall, sewerage sys. **$238,000.**

Wash., Enumclaw—City, City Hall, sewerage sys. **$192,000.**

Wash., Okanogan—City, City Hall, sewerage sys. **$161,320.**

●**Wash., Seattle**—Lake City Sewer Dist., c/o J. W. Carey & Assoc., engrs., 1917 1 Ave., Zone 1, treatment plant. **$1,500,000.** CD 9/22—ENR 10/14.

●**Alta., Calgary**—City, M. J. Miller, clk., ratepayers defeated by-law storm sewer program. Approx. **$1,300,000.** CD 11/20/47—ENR 12/11/47.

BRIDGES

Calif., Artesia—Bd. Supervs., Orange Co., Santa Ana., 270 ft. 4 lane rein. con. bridge over Coyote Creek, near here. **$170,000.** H. Springer, engr.

Minn., Fergus Falls—City, I. Mickelson, clk., bridge, Cascade St. **$135,000.** W. K. Johnston Eng. Co., 1125 Metropolitan Life Bldg., Minneapolis, engr.

Oklahoma—State Hy. Dpt., Oklahoma City,

Oklahoma Co.—Underpass under Atchison, Topeka and Santa Fe Ry., at North Grand Blvd. in Oklahoma City. **$275,000.** S. K. McClelland, c/o owner, engr.

†**Tennessee**—Tennessee Valley Auth., New Sprankle Bldg., Knoxville, bridge (to be built in such a way that it can be widened later to a 4 lane roadway of 52 if necessary) across Chickamauga Dam near Chattanooga, Hamilton Co.

Wash., Concrete—Skagit Co., Courthouse, Mount Vernon, voted bonds, bridge over Skagit River. **$700,000.** H. A. Walberg, co. engr. CD 9/29—ENR 10/14.

●**British Columbia**—Province of B. C., Parliament Bldgs., Victoria,

Rosedale-Agassiz—Bridge, **$2,000,000.** Swan, Rhodes & Wooster, 718 Granville St., Vancouver, engrs.

STREETS AND ROADS

Fla., Sarasota—City, C. Bischoff, mgr., street imprvs. **$300,000.** CD 1/21/44—ENR 2/10/44.

Ga., Augusta—City, street imprvs. **$500,000.** Patchen & Zimmerman, Daniel Field, Augusta, consult engrs. CD 10/27—ENR 11/11.

Ore., Portland—Multnomah Co., Courthouse, grading, paving 2 mi. Multnomah Blvd. **$94,000;** 0.75 mi. Palatine Hill Rd. **$27,000;** 1.5 mi. S. E. Cleveland St., **$45,000;** 1.5 mi. Saratoga Rd. **$40,000;** 1.5 mi. Cornell Rd., **$95,000;** grading, macadamizing 1.5 mi. Woodward Rd. **$25,000;** 2 mi. Hurlburt Rd. **$75,000;** 0.5 mi. N. E. Morris St. **$10,000;** Troutdale Rd **$35,000;** Rockwood Rd. **$15,000;** grading, asphaltic concrete paving N. E. Halsey St. **$45,000.** G. M. Buck, co. roadmaster.

Pa., Sharon—City, new pavement constr. on various streets, **$100,000** Joseph Harris, city engr.

Tex., Crane—Crane Co., c/o judge, Courthouse, voted bonds, addnl. road imprvs. **$100,000.** CD 10/21—ENR 11/11.

Tex., Fort Worth—City, M. O. Jones, mgr., widening, paving approx. 2 mi. Sylvania Ave. **$330,000.** Carter & Burgess, 403 Century Bldg., consult. engrs. CD 12/1.

●**Tex., Orange**—Orange Co., c/o Comrs. Court, voted bonds, farm-to-market roads, 7 mi. Precinct 1, **$168,000;** 15 mi. Precinct 2, **$360,000;** 16 mi. Precinct 3, **$354,000;** 12 mi. Precinct 4, **$288,000.** CD 11/10—ENR 11/25.

Wash., Kelso—City, City Hall, curbs, gutters, sidewalks and storm sewers in L. I. D. N 94, North Kelso. **$127,631.** E. A. Dorner, city engr.

EARTHWORK, WATERWAYS

O., Cleveland—City, widen Cuyahoga River at Irishtown Bend, Sect. I, involving installation 1,017 ft. bulkheading **$280,000;** broaden channel from 100 to 160 ft., **$200,000.**

Ore., Klamath Falls—Klamath Irrigation Dist., Klamath Falls, voted bonds, 2 pump. plants and lateral imprvs. **$150,000.**

AIRPORTS AND AIRBASES

Kan., Manhattan—AIRPORT IMPRVS.—City, City Hall, voted $83,735 bonds, municipal airport extens., imprvs. **$167,470.** D. C. Wesche, city engr. CD 10/18—ENR 11/4.

Minn., Mankato—AIRPORT IMPRVS.—City, H. J. Matson, clk., voted $110,000 bonds municipal airport imprvs. **$385,000.** Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, consult. engrs. CD 12/2.

S. C., Columbia—AIRPORT—City and Richland Co., plans by Lafaye, Lafaye & Fair, 1226 Sumter St., terminal bldg. at Capital Airport. **$400,000.**

●†**Wash., Moses Lake**—AIR BASE—U. S. Air Force, The Pentagon, Arlington, Va., converting bachelor officers quarters at air base into permanent housing, **$209,000;** rehabilitate base, **$4,843,000.**

AMERICANS ABROAD

France—Government of France, steel mill to be financed with Marshall Plan funds. Five American firms are negotiating to build. They are Bliss Mfg. Co., Salem, O., U. S. A., Continental Fdry. & Machine Co., Starr Bldg., Pittsburgh, Pa., U. S. A., Mesta Machine Co., West Homestead, Pa., U. S. A., United Eng. & Fdry. Co., 1st Natl. Bldg., Pittsburgh, Pa., U. S. A. and Wean Eng. Co., Warren, O., U. S. A. Westinghouse International Co., a Westinghouse subsidiary, will do electrical work for the mill. "Sollac" made up of 8 French firms, will operate the plant. **$50,000,000.**

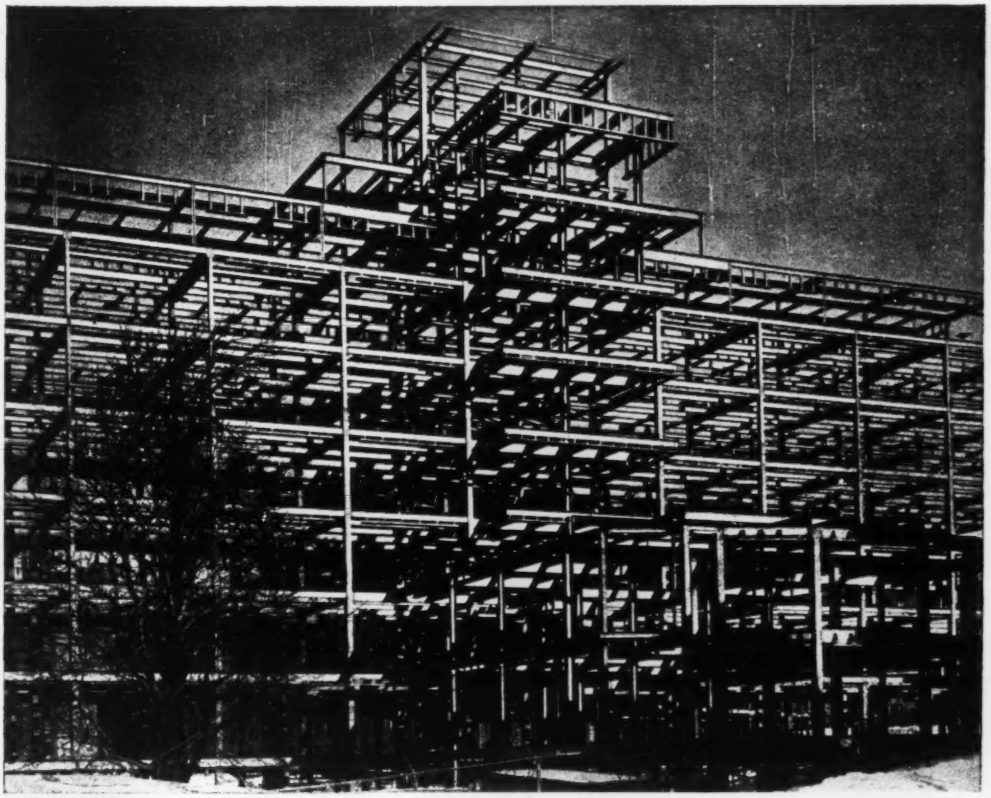
LATIN AMERICA

Mexico—Mexican Govt., Scria. de Comunicaciones y Obras Publicas, Mexico, D.F., plans road to connect Nautla, Villa Cardel and Plan de Las Hayas. **$900,000.** CD 1/30/46—ENR 2/21/46.

Mexico, Mexico City—Cables, Conduits & Fittings, Ltd., St. Jean, Que., Canada, plans electric supply factory. **$3,000,000.**

Mexico, Mexico City — Posa Films, S.A., Morelos, 104, Mexico, D.F., plans television studio. **$1,500,000.**

Mexico, Mexico City—Reichhold Chemicals, Inc., 601 Woodward Heights, Ferndale, Detroit, Mich. U. S. A., plans resin plant. **$500,000.**



Architects and Engineers: Department of Public Works, City of New York, in consultation with James Gamble Rogers, architect, New York, and Sears & Kopf, consulting engineers, New York. *General Contractor:* Gerace & Castagna, Inc., Brooklyn. *Steel Fabricator:* Harris Structural Steel Co., New York.

Pattern in Steel

This huge concentration of steel is the framework for Florence Nightingale Hospital, in upper Manhattan. Owned by the Department of Hospitals of the City of New York, the ten-story, 331-room structure will have facilities for 307 patients, and will include research laboratories for the study and control of cancer. Its two lower stories are to be finished with granite ashlars, while facing brick with limestone trim has been chosen for the remainder of the building.

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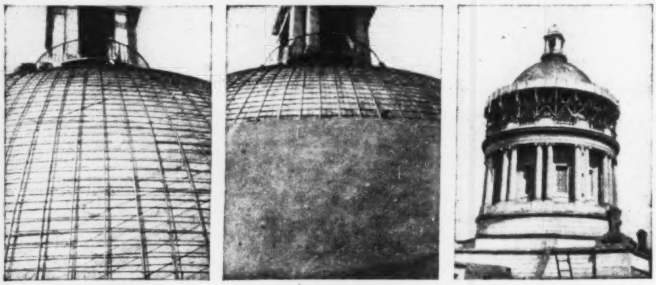

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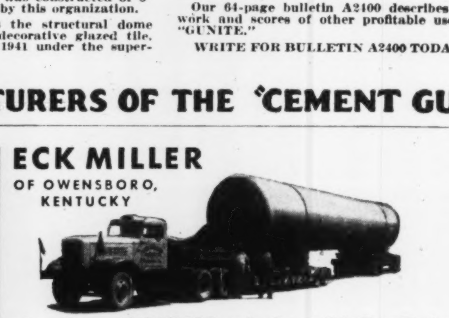

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Mexico, Queretaro—Mexican Govt., Sra. de D.N., Palacio Nacional, Mexico, D.F., plans military calvary depot, with barracks, stables, warehouses, etc. **$300,000.**

PUBLIC BUILDINGS

Ala., Cullman — City, West Cullman Jr. High School. **$300,000.**

Ark., El Dorado—El Dorado School Bd., El Dorado, plans by Herbert Voelker & Assoc., 2801 San Jacinto St., Houston, Tex., 1 story bsmnt. Junior High School. **$300,000.** CD 7/29—ENR 8/19.

Calif., Berkeley—Berkeley Bd. Educ., 1414 Walnut St., plans by Bamberger & Reid, 417 Market St., San Francisco, 2 story 20 classroom, steel, concrete, Columbus School. Over **$250,000.** CD 7/12/46—ENR 8/8/46.

Calif., Concord—Concord-Concord Local Hospital Dist., c/o Clerk Contra Costa Co., Hall of Records, Martinez, hospital, near here. Over **$250,000.**

Calif., El Cerrito (br. Richmond)—Richmond Elementary School Dist., 408 Bissell Ave., Richmond, plans by Miller & Warnecke, Financial Center Bldg., Oakland, 1 story, steel, frame, concrete block, 14 classroom Miravista Elementary School, **$140,000.**

Calif., Mill Valley—Mill Valley School Dist. plans by Alfred W. W. Johnson, 681 Market St., San Francisco, 10 classroom school addn. **$252,000.** Bond issue approved. Carl W. Zoellner, Box 315, Roso, consult. engr.

Conn., Simsbury—Town, Paul D. Collier, chn. Bldg. Comn., plans by Carl J. Malmfeldt & Assoc., 36 Pearl St., Hartford, Central School alterations, addn. 6 classrooms, kindergarten, gym-aud. comb., administration, health, library, cafeteria and kitchen dpts. **$250,000.** CD 12/1.

●**Conn., Stamford**—City, Housing Authority, 56 Putnam Lane, plans by William F. R. Ballard, 123 E. 77 St., New York 21, N. Y., housing, Cove St. **$1,750,000,** Harrison, Ballard & Allen, 123 E. 77 St., New York 21, N. Y., housing consultants. (**Correction**—name of architect). CD 11/1—ENR 11/25.

Fla., Tampa—Hillsborough Co. Bd. Educ., plans by M. Leo Elliott & Asociates, Citizens Bldg., high school, Plant City. Over **$250,000.** CD 4/22—5/13.

Ga., Augusta—City, plans by Scroggs & Ewing, Augusta, imprv. University Hospital. CD 10/27—ENR 11/11.

Ind., Kokomo—School City, O. M. Swihart supt., High School Dpt., E. Superior St. plans by Wm. C. McGuire, 1400-01 Fletcher Trust Bldg., Indianapolis, Roosevelt Vocational School. **$370,000.** CD 7/1/46—ENR 8/8/46.

Ia., Estherville—Independent School Dist., c/o Secy. and Maurice Burrell, pres., plans by Keffer & Jones, 202 Masonic Temple Bldg., Des Moines, 2 story, bsmnt., 59 x 162 ft., brick, concrete Jackson School, **$275,000.**

Ia., Mason City—Independent School Dist., B. L. Main secy. Bd. Educ., Mason City, plans by Hansen & Waggoner, 11½ S. Federal St., 2 story, 62x144 ft., brick concrete school addn., 63x73 ft. gymnasium. **$385,000.** CD 11/11—ENR 12/9.

†**Kan., Fort Leavenworth**—U. S. Eng., 601 Davidson Bldg., Kansas City, Mo., printing plant, **$400,000.**

Kan., Goodland — Bd. Educ., plans by Thomas A. Williamson, National Bank Topeka Bldg., Topeka, school, **$252,000.**

Kan., Lawrence—Bd. Educ., Corlett Cotton, chn. and D. E. L. Novotny, supt., plans by Griest & Ekdahl, New England Bldg., Topeka, high school, 19 and Louisiana Sts., Cordley School annex, remodeling, modernizing Liberty Memorial High School. **$720,000.** CD 10/21—ENR 11/11.

Ky., Glasgow—City, City Hall, Sampson Hospital wing. **$600,000.**

Mass., Amesbury—Town, Housing Authority, N. E. Olson, secy., 19 School St., 27 unit veterans housing, Macy St. **$278,417.**

Mass., Amherst—Town School Dpt., Amherst, plans by Bernhard Dirks, Montague, 2 story, bsmnt., 61 x 126 x 225 ft., steel, brick school. Over **$250,000.** CD 5/28/47—ENR 6/12/47.

Mass., Andover—Town, Housing Authority, c/o W. Newcomb, Andover Savings Bank, 61 Main St., plans by Clinton F. Goodwin, 25 Washington Sq., Haverhill, 56-unit veterans housing. **$560,000.**

Mass., Bellingham—Town, Housing Authority, A. Staves, chn., R. F. D. 1, Woonsocket, R. I., 30 unit veterans housing. **$300,000.**

●**Mass., Boston**—City of Boston Housing Authority, 10 Post Office Sq., plans by John M. Gray, 175 High St., thirty, 3 story, bsmnt., brick apartments, Roxbury, **$300,000;** plans by Thomas F. McDonough, 25 Huntington Ave., 264 unit veterans housing, Faneuil and Market Sts., Brighton, **$2,500,000;** 800 unit veterans housing Calf Pasture, Old Colony Blvd., Dorchester, **$8,000,000;** and 300 unit, veterans housing Wood memorial, Dorchester, **$3,000,000;** 256 units veterans housing, Jamaicaway-Jamaica Plain, **$2,500,000.**

Mass., Brockton—City, Housing Authority, ity Hall, plans by Edward Sears Read & Assoc., 177 State St., Boston, veterans housing. Over **$250,000.**

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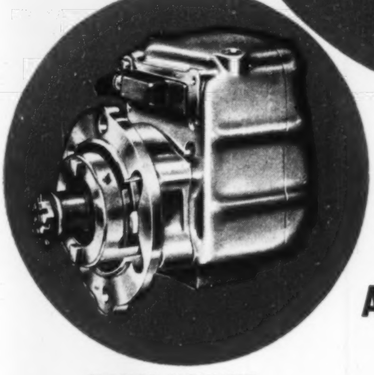

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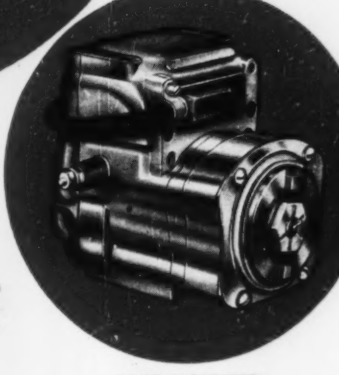

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Mass., Easthampton—Town Housing Authority, R. O'Brien, chn., Northampton St., 31-unit veterans housing. **$360,000.**

†Mass., Taunton—U. S. Eng., Bldg., 21, Naval Dry Docks, South Boston, 1 story, masonry motor vehicle storage bldg.

Mass., Haverhill—City Housing Authority, B. E. McGregor, chn., City Hall, plans by Desmond & Lord, 6 Beacon St., Boston, 30 unit, veterans housing, Summer St. **$300,000.** CD 6/25/46—ENR 7/4/46.

Mass., Leominster — City, School Dpt., plans by Harold E. Mason & Edward L. Baker, 42 Main St., 3 story, bsmnt., high school addns., alterations. **$633,000.** CD 8/6/47—ENR 8/21/47.

Mass., Methuen — Town Housing Auth., Methuen, plans by Edward Sears Read & Assoc., 177 State St., Boston, 60 unit veterans housing. **$600,000.**

Mass., Nantucket — Town and Nantucket Co., School Dpt., plans by Tallman LaBrode, & Rounseville, 222 Union St., New Bedford, Cyrus Pierce School addn., Atlantic Ave. **$250,000.**

Mass., South Lynnfield — Town, School Dpt., Lynnfield, plans by Frank Irving Cooper Assoc., 554 Pleasant St., Milton, school. **$250,000.**

†Mass., Fall River—U. S. Eng., Bldg. 21, Naval Drydocks, South Boston, 1 story, masonry motor vehicle storage bldg.

Mich., Bay City—Bd. Educ., School Dist. of Bay City, 1800 Columbus Ave., plans by Joseph C. Goodeyne, 417 Bay City Bank Bldg., school. **$400,000.** Harry Van Wagner, 1011 N. Hampton St., consult. engr. CD 10/25/44—ENR 11/16/44.

Minn., Albert Lea — Bd. Educ., W. B. Lyon, clk., Albert Lea, plans by LeRoy Gardner, Albert Lea, school. **$250,000.** CD 12/17/47—ENR 1/8/48.

Miss., Webb — Tallahatchie Co., Charleston, plans by E. L. Malvaney, Millsaps Bldg., Jackson, high school. **$600,000.**

Mo., Kirkwood (St. Louis, Zone 22, P. O.)—Kirkwood School Dist., Bd. Educ., Floyd W. Hendricks, supt. Schools, S. Kirkwood Rd., plans by Bonsack & Pierce, Inc., 308 N. 6 St., St. Louis, Zone 1, brick, concrete, stone, Henry Hough School, N. Sappington Rd. **$250,000.**

Neb., Holdrege—Bd. Educ., Holdrege, plans by J. W. Radotinsky, 1401 Fairfax Trafficway, Kansas City, Kan., school. **$300,000.**

†Neb., Lincoln—U. S. Eng., 1709 Jackson St., Omaha, shop and storage. **$150,000.**

Neb., Schuyler—Colfax Co., Schuyler, hospital. **$250,000.**

Nev., Boulder City — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., plans by Gordon B. Kaufmann & J. E. Stanton, engrs. and archts., 627 S. Carondelet St., Los Angeles, Calif., 42,000 sq. ft. cement block, rein.-con. high school. **$750,000.**

N. J., Collingswood—Bd. Educ., Collingswood, plans by Radey & MacNelly, 101 N. 7 St., Camden, gymnasium. **$300,000.** Horace B. Nicholson, 1600 Walnut St., Phila., Pa., consult. engr.

N. J., Hillside—Bd. Educ., plans by Jacob Wind, Jr., 1444 N. Broad St., high school wing. **$400,000.**

●N. Y., Arverne — New York City Housing Auth. 63 Park Row, New York, Zone 7, plans by Simeon Heller, 135-45 Roosevelt Ave., Flushing, Proj. N. Y. C. 18, Arverne Houses, seven 6 story bldgs. on 18 acre site bounded by Rockaway Beach and Arverne Blvds., Beach 56 St., Beach Channel Dr. and Beach 54 St. **$4,000,000.** Tuck & Eipel, 101 Park Ave., New York, Zone 17, structural engrs. Sears & Kopf, 55 Broadway, New York, Zone 6, mechanical engrs. Leo A. Novick, 22-25 Brookhaven Ave., Far Rockaway, landscaping engr.

●N. Y., Brooklyn—President Brooklyn Boro, Boro Hall, plans by Charles A. Riedel, c/o owner, 2 story garage and machine shop for Bureau Hys. & Sewers, at 416-420 Hamilton Ave. **$1,230,000.** CD 8/29/45—9/20/45.

●N. Y., New York—New York City Housing Auth., 63 Park Row, Zone 7, plans by York & Sawyer, 101 Park Ave., Zone 17, Proj. N. Y. C. 7, St. Nicholas Houses, eight 14 story bldgs. on site bounded by W. 127 St., Seventh Ave., W. 129 St. and 8 Ave. **$8,000,000.** Fred N. Severud, 415 Lexington Ave., Zone 17, structural engr. Meyer, Strong & Jones, 101 Park Ave., Zone 17, mechanical engrs. Lay & Lay, 101 Park Ave., Zone 17, landscaping engrs. CD 4/13—ENR 4/29.

N. D., Grand Forks—Bd. Educ., Grand Forks, plans by San De Remer, 610 Viets Ave., school addns. **$260,000.** CD 11/4—ENR 11/25.

N. D., Jamestown—State Bd. Admin., Bismarck, employees bldg. at State Hospital for Insane. **$250,000.**

O., Ironton-Dawson — Bryant School Dist., G. W. Webb supt., 15 room modern school. **$300,000.**

●O., Niles—City, Niles Memorial Hospital. **$1,000,000.**

Tenn., Blountville—Sullivan Co., Blountville, plans by R. V. Arnold, Bristol, Va., Holston Valley High School; Emmett School addn., **$275,000** each.

●Tex., Arlington—North Texas Agricultural College, Arlington, plans by Carlton Adams, College Station, masonry classroom bldg. **$275,000**; auditorium, **$250,000**; fine arts and library,

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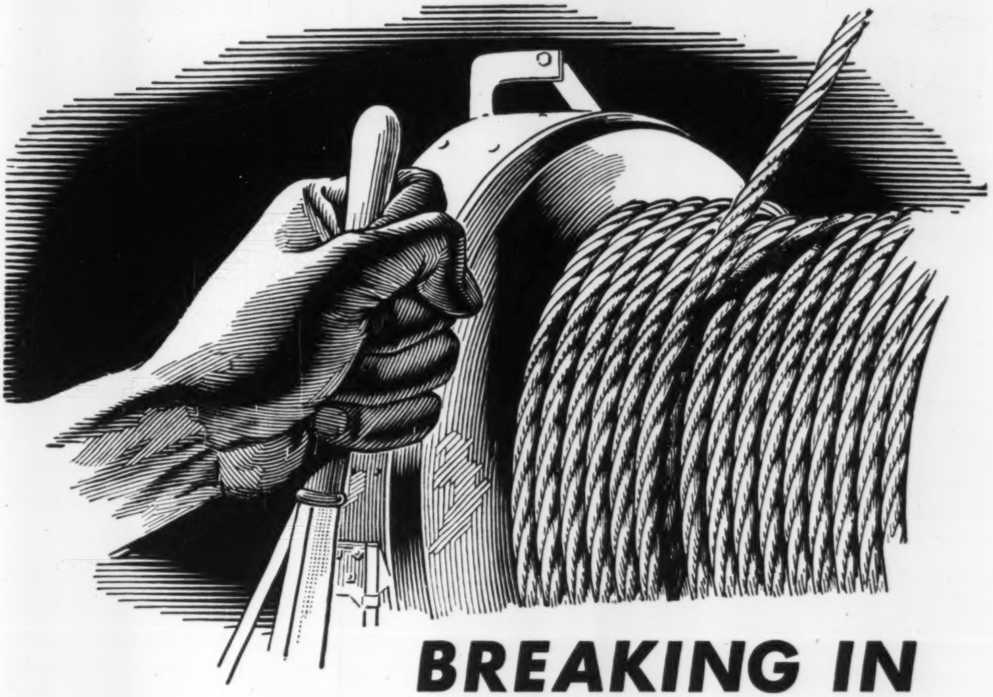

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$375,000; student union, **$275,000**; administration, **$325,000**; women's dormitory, **$300,000.** CD 8/19/46—ENR 9/5/46.

+Tex., Corpus Christi—U. S. Naval Hospital, Naval Air Station, Corpus Christi, increasing hospital from 250 to 350 beds. **$500,000.**

Tex., Dallas—City and Dallas Co., plans by George L. Dahl, 1920½ Main St., Boys Industrial School imprv., remodeling at Hutchins. **$250,000.** CD 12/1.

Tex., Dallas—Dallas Co., c/o Al Templeton, judge, Courthouse, plans by Maurice Peterman, 4303 Trellis Court, repairing, remodeling, expanding Sunshine Home and Industrial School for Boys, **$250,000.** W. D. Robinson, 4303 Trellis Ct., consult. engr. CD 12/1.

Tex., Dumas—Dumas Independent School Dist., H. Foreman, pres., plans by Macon O. Carder, Medical Arts Bldg., Amarillo, school classroom bldg. and gymnasium. **$350,000.** CD 10/22—ENR 11/11.

Tex., Lewisville — Lewisville Independent School Dist., Lewisville, plans by Brown & Brown, 1905 N. Harwood St., Dallas, masonry high school and remodeling school. **$275,000.**

Tex., Lufkin — Lufkin Independent School Dist., Lufkin, plans by Wilbur Kent, 110 E. Menefee St., Negro Junior-Senior High School, **$275,000**; Oak Grove School-gymnasium, **$250,000**; Senior High School mechanical shop, **$75,000.**

Tex., Tulia—City, electric light and power plant. **$135,000.**

Utah, Salt Lake City—Bd. Educ., Howard Barker, supt., 440 E. 1st South St., voted **$2,600,000** bonds and 1 mill extra tax levy, school, Junior High School, Senior High School, gymnasiums at present Senior, East and West High Schools.

Vt., White River Junction—Hartford School Dist., Town Hall, plans by Hudson & Ingram, Hanover, N. H., school. **$400,000.** CD 9/19/46—ENR 10/3/46.

Wash., Cashmere — School Bd., Cashmere, voted bonds 1 story masonry school, central heating plant and high school addn. **$550,000.** W. A. Johnson & H. W. Hall & Assoc., 1st. Natl. Bank Bldg., Everett, archts. CD 6/21—ENR 7/8.

Wash., Leavenworth—School Dist. 128, Leavenworth, school. **$300,000.**

Wash., Lynden — School Dist. 504, Lynden, voted bonds, 2 story, bsmnt., 100 x 120 ft. concrete school addn. **$274,500.** Carlson, Eley, Grevstad & Peterson, 2 and Cherry Bldg., Seattle, Zone 4, archts. CD 5/24—ENR 6/10.

●**Wash., Ephrata** — School Bd., Ephrata, school, **$500,000**; high school, **$1,000,000.**

Wis., Menomonie—Bd. Educ., Menomonie, plans by Wm. M. Ingemann & M. V. Bergstedt, 345 Minnesota St., St. Paul Minn., Central School addn. **$300,000.** Bonds voted. CD 9/28—ENR 10/14.

●**Wis., Milwaukee**—Housing Auth. of Milwaukee, 844 N. Market St., Zone 2, Berryland Housing, 200 single family units or 400 multiple units. **$4,000,000.**

Wis., Port Washington — Bd. Educ., Port Washington, plans by Foeller, Schober, Berners, Safford & Jahn, 310 Pine St., Green Bay, school. **$380,000.** CD 7/19/45—ENR 8/2/45.

Wis., Racine—Racine Co., mental asylum alterations, **$300,000.** CD 12/8/43—ENR 12/16/43; add 3rd floor to hospital, remodel 2nd floor, **$300,000**; county home addns., alterations, **$300,000.**

●**Que., Montreal**—Hospital Jacques Cartier Bd., 169 St. Laurence St. Longueuil, plans by H. Calame, 1200 St. Alexander St., hospital, Taschereau Blvd. **$1,500,000.**

COMMERCIAL BUILDINGS

Ind., Upland—Taylor University, Upland, plans by LeRoy, Bradley, 3535 St. Joe River Dr., Fort Wayne, 2 story, bsmnt., 67x151 ft., brick Memorial Library. **$300,000.**

Mich., Albion—Sheldon Memorial Hospital, 803 Superior St., hospital addn. **$300,000.**

Minn., Alexandria—St. Marys Church, Rev. W. A. Renner, plans by Slifer & Cone, 442 Endicott Bldg., St. Paul, church, **$250,000.**

N. J., Bridgeton — Beth Abraham Synagogue, 109 N. Pearl St., Community Center and Hebrew School. **$250,000.**

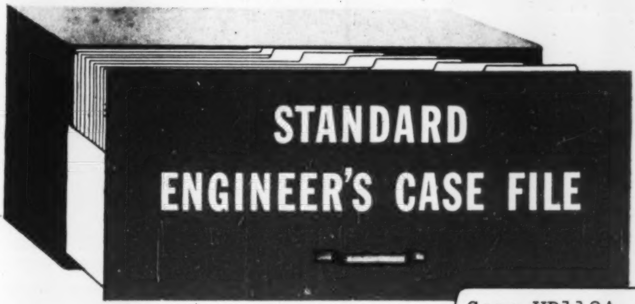
●**Pa., Phila.**—Methodist Episcopal Hospital, Broad and Wolf Sts., plans by The Ballinger Co., 121 N. Broad St., nurses training school, **$700,000**; other imprvs. **$550,000.** CD 12/12/45—ENR 12/20/45.

●**R. I., Cranston**—Paula Constr. Co., Inc., 34 Meshanticut Valley Parkway, 1 and 2 story, bsmnt. frame housing, Oaklawn Ave. **$1,000,000.**

●**Tenn., Nashville** — Baptist Sunday School Bd., Ninth Ave. N., plans by Hart, Freeland & Roberts, Third Natl. Bank Bldg., 9 story, brick., steel addn. to present 3 story bldg. **$1,000,000.**

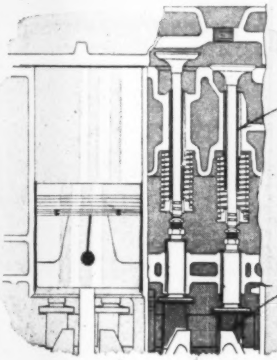
Tex., Bellaire — Homecrafters, Inc., c/o Edward M. Hovas, 324 Hughes St., or 714 Milam St., Houston, plans by Woestemeyer & Gaffney, 2351 Claremont Lane, Houston, 30 brick veneer dwellings, concrete slab fdn., Bel Haven addn. **$550,000.**

●**Wash., Kennewick**—Modern Home Builders, Kennewick, 145 houses. **$1,000,000.**



STANDARD ENGINEER'S CASE FILE

Case HD118A--Minimizing Valve-assembly Wear in Internal Combustion Engines



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B. Provides tough lubricating film -- will not rupture under high pressures and allow metal-to-metal contact ... stops extra wear on cams and other parts.

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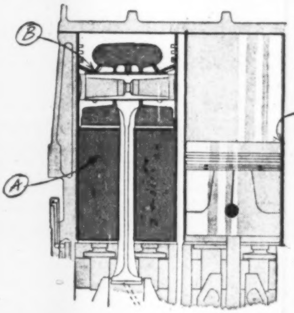
Case HD118B--Eliminating Cylinder Scoring in Internal Combustion Engines



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A. A special compound in RPM Heavy Duty keeps film of oil on cylinder walls and other parts when the engine is idle -- lubricates until oil pump has time to function; keeps oil on parts when they are hot.

B. Cleansing agent keeps oil passages open and pistons and rings clean and working freely -- allows plenty of oil to flow to vital wear points and prevents gouging of cylinders.

C. Maintains oil-film seal on free-working rings -- reduces blowby and loss of power.

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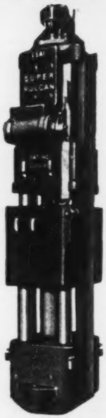

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CONSTRUCTION REPORTS

Bids—Contracts—First Section

WATER SUPPLY

BIDS ASKED

January 11

Pa., Shamokin Dam—Shamokin Dam Water & Sewerage Auth., Fred G. Haddon, secy., Shamokin Dam, water distr. sys. Richard J. Harman, 222 N. 3 St., Harrisburg, engr.

January 14

Del., Smyrna—Town, water treatment plant. Plans deposit $25. J. C. Remington Jr. & J. J. Boyd, 503 Market St., Camden, N. J., consult. engrs.

January 15

Ga., Buchanan—City, WW imprvs. $400,000. Plans deposit $15, J. P. Baskin & Assoc., P. O. Box 101, Rome, engrs.

January 19

Mass., New Bedford—Water Bd. Municipal Bldg., pumping equip., Little Quittacas Pond Pumping Station, Rochester. Plans deposit $5. Fay, Spoffard & Thorndike, 11 Beacon St., Boston, engrs. CD 7/9—ENR 7/22.

January 25

Wash., Leavenworth—City, City Hall, 2 deep well turbine pumps, motors, starting equip. and gasoline auxiliary drive engine for one of the pumps, all for $40,000; pump. plant and horizontal infiltration water supply sys. Parker & Hill, Smith Tower, Seattle, Zone 4, engrs.

January 26

Pa., Carmichaels—At office of G. Wilbur Keister, secy. of Carmichaels Boro, WW imprvs., Contr. 1, 8 in. rising main, Contr. 2, filtration plant and pump. station, Contr. 3, plumbing; Contr. 4, heating and Contr. 5, electrical work. Plans deposit $25. The Chester Engineers, 210 East Park Way, North Side, Pittsburgh, Zone 12, engrs. CD 11/7/46—ENR 11/28/46.

LOW BIDDERS

Calif., San Francisco—Pub. Utilities Comn., City Hall, Dec. 21, elevated tank or standby pipe, for Potrero Heights, Spec. 473A, from Chicago Bridge & Iron Co., 22 Battery St., **$30,477.**

Pa., Warren—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, Dec. 22, water distr. sys. alterations, addns. at Warren State Hospital, North Warren, from Harry Dougherty & Sons, Inc., Freeport, **$83,500.** Est. $100,000. CD 11/24—ENR 12/2.

Tex., Bloomington—Victoria County Water Control & Imprvt. Dist. 1, W. P. Skarda, pres., Dec. 20, Contrs. 1 and 2, WW extens., from Gerald Mora, 312 Sabine St., Houston, **$51,721.** Est. $35,000. CD 12/7—ENR 12/9.

Tex., Gainesville—City, Dec. 20, dismantling, re-erecting steel water tank and tower, from Pittsburgh-Des Moines Steel Co., Praetorian Bldg., Dallas, **$24,800;** concrete fdns. by owner, **$6,200.** Total $31,000. CD 12/7—ENR 12/9.

CONTRACTS AWARDED

●**Calif., Los Angeles**—Metropolitan Water Dist. of Southern Calif., 306 W. 3 St., West Basin Feeder, 6.8 mi. 48 in. D. rein.-con. cylinder pipe rubber gasket joints, to United Concrete Pipe Corp., P. O. Box 425, Baldwin Park, **$1,247,330.** Bids 12/14, awarded 12/17, CD 12/21—ENR 12/23, under LB.

Tex., Highland Park—Dallas County Park Cities Water Control & Imprvt. Dist. 2, 30 and 36 in. c.i. water supply main, to Williams & Whittle, 5422 Mockingbird Lane, Route 7, Box 429-A, Dallas, **$535,325.** Bids 12/20. CD 12/2—ENR 12/9.

Tex., Houston—Home Owned Estates & Affiliated Bldg. Companies, 10901 Market St. Rd., c.i. waterlines, in Green Bayou, sect. off Houston-Port Arthur Hy., own forces, **$65,000.**

Que., Gaspe—Municipality, water sys., to A. Bedard, 132 St. Patrick St., Quebec City. Est. over **$50,000.** Bids 11/15. Z. Langlois, 105 Mountain Hill, Quebec City, engr. CD 11/11.

SEWERS, WASTE DISPOSAL

BIDS ASKED

January 11

Pa., Shamokin Dam—Shamokin Dam Water & Sewerage Auth., Fred G. Haddon, secy., Shamokin Dam, sanitary sewerage sys., sewage treatment plant. Richard J. Harman, 222 N. 3 St., Harrisburg, engr.

January 13

Wash., Spokane—City, City Hall, intercepting sewerage sys., Sect. G (Pettet Dr. unit), $347,595; Sect. D (Division St. unit), $137,495. Plans deposit $10 each. C. E. Davis, city engr. CD 6/14/46—ENR 6/27/46.

January 17

Mont., Havre—City, City Hall, sewage plant, $60,000. Burns & McDonnell, 95 St. and Troost Ave., Kansas City, Mo., engrs. CD 7/29—ENR 8/5, under LB.

January 19

N. J., Cedar Grove—At office W. H. Butler III, purch. agt., Essex Co., Hall of Records, Newark, sewage treatment plant, Overbrook Hospital. Plans deposit $25. Havens & Emerson, Woolworth Bldg., 233 Broadway, New York 7, N. Y., engrs.

Wash., Vancouver—City, City Hall, sewage treatment plant, pump. stations. $360,000. Plans deposit $35. Stevens & Koon, Spalding Bldg., Portland, Ore., engrs. CD 11/11—ENR 11/25.

January 20

S. C., Clinton—State Training School, c/o R. C. Johnson, engr., 2065 Blossom St., Columbia sanitary sewerage sys. at Boys Training School. Approx. $50,000. Plans deposit $10.

LOW BIDDERS

●**Colo., Denver**—City, City & County Bldg., Dec. 28, sewage treatment plant addns., from Thomas Bate & Sons, 2311 10 St., **$1,441,000.** Est. $1,460,000. CD 11/29—ENR 12/2.

Idaho, Nampa—City, City Hall, Dec. 20, sewage disposal plant, from J. O. Young & Son, and C. Warren Duffy, 211 17 Ave. N., Nampa, **$427,279.** CD 11/24—ENR 12/2.

Que., Montreal—Municipality, Dec. 18, replacement Lafontaine St. Sewer, from Spino Constr. Ltd., 10156 Blvd. St. Lawrence, **$54,990.** CD 12/8.

CONTRACTS AWARDED

Ia., Jefferson—City, City Hall, sewage plant, to R. V. Leary Contractor, Security Bldg., Des Moines, **$146,875.** Bids 12/14. CD 12/7—ENR 12/9.

La., East Baton Rouge—East Baton Rouge Parish Police Jury, East Baton Rouge, sanitary sewerage sys., Dist. 9 to Sullivan, Long & Hagerty, 2026 6 Ave. N., Bessemer, Ala., **$189,040.** Bids 12/14, awarded 12/16. CD 11/24—ENR 12/2.

Tex., Corpus Christi—City, sanitary sewer line Water St., force account, **$70,000.** Robert L. Otto, city engr. CD 10/15/47—ENR 10/30/47.

Que., Gaspe — Municipality, sewerage sys., to A. Bedard, 132 St. Patrick St., Quebec City. Est. **$65,000.** Z. Langlois, 105 Mountain Hill, Quebec City, engr.

BRIDGES

BIDS ASKED

On or About February 16

+**Illinois**—U. S. Eng., 520 Merchandise Mart, Chicago, Zone 54, deck girder overpass structure, Toledo, Peoria & Western R. R., vicinity of East Peoria.

LOW BIDDERS

●**N. Y., New York**—Port of New York Auth., 111 8 Ave., Zone 11, Dec. 21, West 179 St. Tunnel, from Poirier & McLane Corp., 33 W. 42 St., Zone 18, **$5,559,813.** CD 11/24—ENR 12/2.

CONTRACTS AWARDED

●**Missouri**—State Hy. Dpt., Jefferson City, 40 ft. I-beam, plate girder span bridge over Southwest Blvd. and Terminal R. R. tracks, part of Southwest Trafficway, Rt. 69, Proj. U18882A, Jackson Co., to American Bridge Co., 1221 Locust St., St. Louis, **$1,708,408.** Bids 10/29, awarded 11/12. CD 11/4—ENR 11/11, under LB.

New Jersey—Spencer Miller Jr., comr. State Hy. Dpt., Trenton, superstructure Grassy Sound Bridge, Rt. S-49, Cape May Co., to Kolyn Constr. Co., 150 E. State St., Trenton, **$892,430.** Bids 11/30, awarded 12/22. CD 12/2—ENR 12/9, under LB.

●**New York**—Bureau Contracts & Accounts, Albany, steel superstructure on 0.94 mi. Meeker Ave. Viaduct on Brooklyn-Queens Expressway, Kings Co., to American Bridge Co., 71 Broadway, New York, Zone 6, **$4,374,564.** CD 10/18—ENR 10/21, under LB.

●**Oregon**—State Hy. Comn., Salem, ramp approaches and paving west end steel bridge, Portland, Multnomah Co., to Kuckenberg Constr. Co., 11104 N. E. Holman St., Portland, **$1,277,597;** rein.-con. viaduct over Trask River, Oregon Coast Hy., Tillamook Co., to Lindstrom Bros., 7335 N. E. Bway., Portland, **$102,325.** CD 12/2 and 12/9—ENR 12/9.

Wash., Wenatchee—Chelan Co. Courthouse, riprapping 600 ft. Wenatchee River near Monitor Bridge and rebuilding east approach to bridge, to Larson Constr. Co., Wenatchee, **$52,500.** Est. $80,000. D. B. West, co. engr.

STREETS AND ROADS

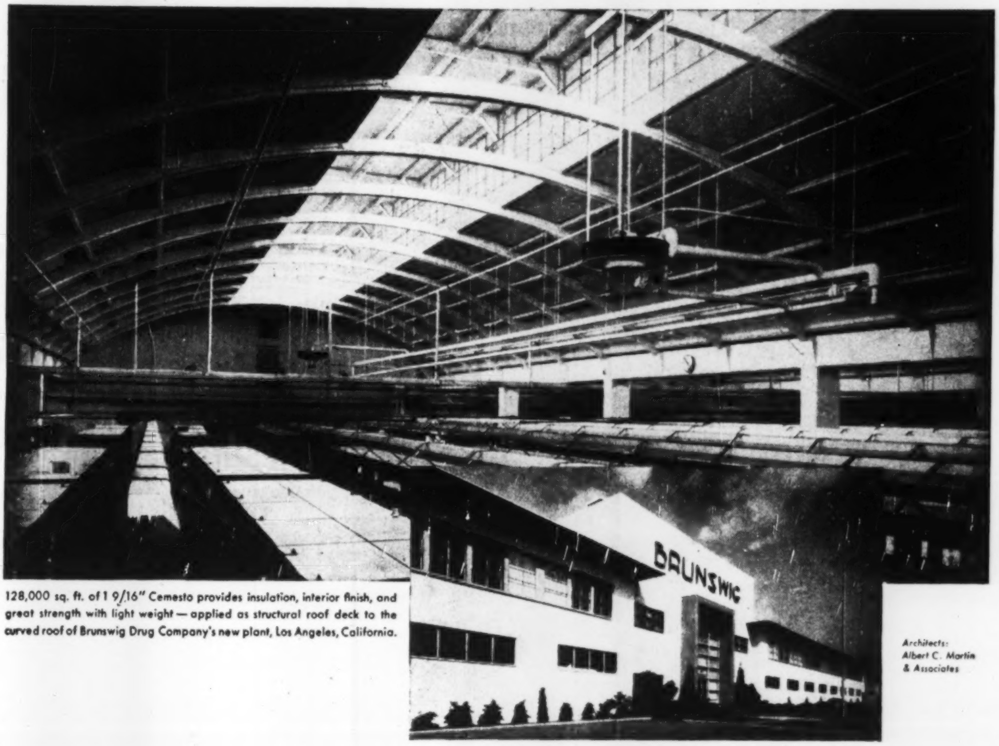
BIDS ASKED

January 11

Calif., San Francisco — State Div. Architecture, Pub. Wks. Bldg., Sacramento, grading, paving roads, grading, paving interior bldg., installing metal pens, etc. at 1-A Dist. Agricultural Assn., Plans deposit $25. Anson Boyd, Sacramento, state archt.

LOW BIDDERS

Colorado — State Hy. Dpt., Denver, Dec. 17, grading, structures, 2.342 mi. State Hy.



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100 between Beshcar Junction and Kim, Colo. Proj. S0002 (5), Las Animas Co., from Ozzello Constr. Co., Trinidad, **$65,869.** Est. $73,986. CD 12/7—ENR 12/9.

Indiana — State Hy. Dpt., Indianapolis, Dec. 21, bit 3.55 mi. State Rd. 27, Allen Co., from Brooks Constr. Co., 1132 Barthold St., Fort Wayne, **$145,050,** est. $162,080***bit. and slurry pumping 8.99 mi. State Rd. 52, Boone Co., from Grady Bros., 2702 Barnes Ave., Indianapolis, **$218,261,** est. $235,044***bit. 3.9 mi. State Rd. 35, Grant Co., from McMahan Constr. Co., Rochester, **$95,747,** est. $111,301***bit. and slurry pumping, 9.15 mi. State Rd. 67, Greene and Owen Counties, from Reith-Riley Constr. Co., Indiana Ave., Goshen, **$215,121** est. $221,668***bit. 8.01 mi. State Rd. 52, from Junction with Rd. 38 south, Tippecanoe Co., from Fauber Constr. Co., Canal Rd., Box 496, Lafayette, **$191,882,** est. $196,408***bit. 6.91 mi. State Rds. 40, 41 and 42, Vigo Co., from Wabash Valley Asphalt Co., 10½ and Chestnut Sts., Terre Haute, **$177,573,** est. $179,714, rejected bids bit. 5.1 mi. State Rds. 312, 6, 12 and 41, Lake Co., L. B., **$150,821.** CD 12/10—ENR 2/16.

Tex., Houston — City, M. H. Westerman, secy., Dec. 8, asphalt paving Fulton St. from Gulf Bitulithic Co. 2820 Polk Ave. **$114,428.** CD 7/31/46—ENR 8/22/46.

CONTRACTS AWARDED

Nevada — State Hy. Dpt., Carson City, 7.142 mi. highway from point 3 mi. south of a junction with U. S. 40 near Perth to 5 mi. south etc., Pershing Co., to Dodge Constr. Inc., Fallon, **$142,951.** Bids 12/21.

New York—Bureau Contracts & Accounts, Albany, reconstructing 4.82 mi. Route 16 from Holland toward Chafee, to Depew Paving Co., Inc., 4955 Broadway, Depew, **$718,220.** Bids 10/27. CD 10/29—ENR 11/4, under LB.

Tex., Longview — Gregg Co., Longview, road repairing, reconstructing, surf. Precinct 1, **$65,000;** Precinct 3, **$70,000,** force account. CD 7/9—ENR 7/22.

+Washington — Pub. Roads Admin., Broadway-Oak Bldg., Portland, Ore., clearing, grubbing, grading, draining, surfacing, 4.701 mi. Toats Coulee Rd., Cheland National Forest, Washington Forest Development Road Proj. 390-A Okanogan Co., to Halleran Bros., 2550 22 Ave. N. Seattle, **$97,433;** Libby Creek Rd. Chelan Natl. Forest, Washington Forest Development Road Proj. 331-A, Okanogan Co., to C. O. Lindstrom, Bellingham, **$49,576.** Bids 12/22. CD 12/15.

EARTHWORK, WATERWAYS

BIDS ASKED

January 18

+Arizona-Nevada—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Kingman (Louise), Ariz., embedded materials and anchor bolts, crane rails, rail accessories and miscellaneous materials for Davis Power Plant, Davis Dam Proj., Spec. 2514, L. N. McClellan, ch. engr.

+Michigan—U. S. Eng., 609 Federal Bldg., Detroit, Zone 31, flood protection works, incl. excav. cut-off canal, concrete weir, appurtenant structures, vicinity Mount Clemens. Serial No. Eng. 20-064-49-45. Extended date. CD 12/12.

January 19

+Virginia—U. S. Eng., foot of front St., Norfolk, temporary government facilities, Philpott Reservoir Proj., Smith River, Inv. Serial No. Eng-44-110-49-117.

January 20

●+Kentucky—U. S. Eng., 303 U. S. Court House, Nashville, 1, Tenn., clearing approx. 38,000 acres Wolf Creek Reservoir, Serial No. Eng., 40-058-49-54. $4,000,000-$6,000,000. Bids 12/9 rejected. CD 12/28, under LB.

About January 21

+Kentucky—U. S. Eng., 303 U. S. Court House, Nashville 1, Tenn., clearing segments, Group 2, Wolf Creek Reservoir, Cumberland River, 10 mi. southwest of Jamestown, Serial No. Eng. 40-058-49-54. CD 6/9/41—ENR 6/12/41.

January 21

+Oklahoma—Bureau Reclamation, Dpt. Interior, Altus, earthwork and structures, Drains, A-1, C-1, D, D-1 and E and structures, Blair lateral, Blair 3.1 lateral and Altus 4.8 wasteway, W. C. Austin Proj., near Blair, Spec. 2508.

January 25

+Delaware—U. S. Eng., 121 N. Broad St., Phila. 1, Pa., removal, satisfactory disposal approx. 33,000 cu. yd. material lying above a plane 7 ft. below mean low water to provide a channel 60 ft. wide in Delaware Bay entrance to Murderkill River.

+Montana—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Coram, one lot fabricated w. i. pipe, appurtenances; four 18 in. cast-steel, flanged wedge gate valves, gear operated; four 18 in., flanged steel lubricated plug valves, motor operated, without starters and push-button stations; four 18 in. 90 degree, flanged cast-steel elbows with heel boss; four 24 in. inlet strainers, manganese bronze for Hungry Horse Dam, Hungry Horse Proj., Spec. 2511.

January 27

+Kansas—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars

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shipping point, or f.o.b. cars Ellis, two 4 ft. 0-in. by 5 ft. high pressure gates, two 110,000 lb. hydralic hoists, 1 semiautomatic gate, 1 hydraulic gate hanger with parts for selsyn indicator, single throw mercury switch assembly, two 66 in. conduit lining transitions, 1 conduit lining, two 1¼ in. standard shoulder eyebolts, Cedar Bluff Dam, Missouri Basin Proj., Spec. 2515. Plans deposit $2.75. L. N. McClellan, ch. engr. CD 4/25/44—ENR 6/15/44.

On or About February 1

†Montana—U. S. Eng., Fort Peck, right abutment downstream slope drainage sys., Serial No. Eng. 24-016-49151.

February 1

†Montana—U. S. Eng., Fort Peck, furnishing, del. f.o.b. cars Wiota, 1 hoist car for operation at spillway structure, Fort Peck Dam, Fort Peck, Serial No. Eng. 24-016-49-43.

LOW BIDDERS

●†O., Massillon—U. S. Eng., Madison Ave. and 8 St. W., Huntington, 18, W. Va., 250,000 cu. yd. channel excav., 6,300 cu. yd. concrete structure, 302,000 lb. sheet steel piling, Sect. 2, Unit 2, Eng-46-022-49-60, from Sebastian B. Alberg & Sons, 1033 S. Peoria St., Chicago, Ill., **$2,064,678.** Est. $2,246,941. CD 11/5—ENR 11/11.

†Oklahoma—U. S. Eng., Aircraft Plant No. 3, 2000 N. Memorial Dr., Tulsa, Dec. 14, clearing reservoir at Heyburn Dam on Polecat Creek, from Carman-Kirschner Constr. Co., Bristow, **$94,850.** Est. $100,000. CD 12/7—ENR 12/9.

Tex., Beaumont—Jefferson County Drainage Dist. 6, Dec. 21, drainage, dredging Taylors Bayou from Hildebrandt Bayou to junction of north and south forks of Taylors Bayou, from McWilliams Dredging Co., Hibernia Bldg., New Orleans, La., **$210,497;** rejected bids Dec. 21, dredging south fork Taylors Bayou from junction of two branches up to mouth of Mayhaw Bayou, L.B. **$151,580.** CD 12/2—ENR 12/9.

†Wyoming—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., Dec. 14, furnishing, installing 1 electrically operated elevator for Kortes Dam, Missouri Basin Proj., Spec. 2471, from Gust, Lagerquist & Sons, 614 Bradford Ave. N., Minneapolis, Minn., **$32,100.** CD 11/15—ENR 11/18.

CONTRACTS AWARDED

●†California—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Friant, earthwork, concrete lining, structures for Friant Kern Canal, Station 4646 plus 06 to 6076 plus 15, Central Valley Proj., Spec. 2432, to Peter Kiewit Sons Co., 1024 Omaha National Bank Bldg., Omaha, Neb., **$7,494,373.** Bids 11/9, awarded 12/21. CD 11/16—ENR 11/18, under LB.

●†South Dakota—U. S. Eng., 1709 Jackson St., Omaha, Inv. No. Eng-25-066-49-103, Schedule B, tunnels for Fort Randall Proj., to Silas Mason Co., Minden Rd. B. C., Shreveport, La., **$8,585,808.** est. $7,374,393***Schedule C, powerhouse substructure and Talrade, to McCarthy Imprvt. Co., 602 Kahl Bldg., Davenport, Ia., **$10,977,836.** est. $9,471,508. Bids 12/17. CD 12/21—ENR 12/23, under LB.

●†Texas—U. S. Eng., 606 Santa Fe Bldg., Galveston, Grapevine Dam and Reservoir, Inv. No. Eng-41-243-49-96, to Russ Mitchell, Inc. and Wyche & Bruce Constr. Co., Box 5252, Harrisburg Station, Houston, **$1,899,952.** Bids 12/7. CD 12/14—ENR 12/16, under LB.

Wash., Olympia—State Capitol Com., Olympia, first unit of Deschutes Basin Proj., to Scheumann & Johnson, Lloyd Bldg., Seattle, Zone 1, **$915,950.** Bids 12/15. CD 12/21—ENR 12/23, under LB.

AIRPORTS AND AIRBASES

LOW BIDDERS

Ariz., Phoenix—AIRPORT—City, 6,000 ft. diagonal runway at Sky Harbor Airport, from Arizona Sand & Rock Co., S. 7 St., **$237,776.** CD 8/25/47—ENR 9/2/47.

CONTRACTS AWARDED

●†Alaska—AIRPORT—U. S. Eng., (PO 942 c/o P. M., Seattle Wash.), Anchorage, 500-man barracks at Ladd Field, Inv. S 95-507-49-5, and Fort Richardson, Inv. S 95-507-49-2, to Peter Kiewit Sons' Co. and Morrison-Knudsen Co., Inc., Hoge Bldg., Seattle 4, Wash., **$7,250,000.** CD 12/23—ENR 12/30, under LB.

PUBLIC BUILDINGS

BIDS ASKED

January 12

N. Y., Brentwood—Bureau Contracts & Accounts, Albany, rehabilitation Bldgs. 81, 82 and 83 at Pilgrim State Hospital. Plans deposit $20.

January 13

†Colorado—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, furnishing, del. fo.b. cars shipping point or f.o.b. cars Loveland, 3 indoor type grounding reactors for use in neutrals of 6,900 volt, 3 phase, 60 cycle, 16,667 kva generators, complete with sheet metal housings for Estes Power Plant, Colorado Big Thompson Proj., Spec. 2517, L. N. McClellan, ch. engr.

Ill., Peoria—Dpt. Agriculture, Div. Purchases, Sales & Traffic, Independence Ave., between 12 and 14 Sts., S. W., Wash., 25, D. C., motor fuels laboratory bldg., Inv. No. 437-49. Plans deposit $50.

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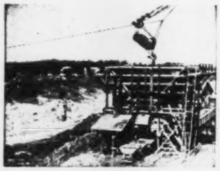

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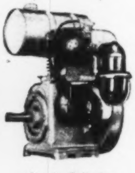
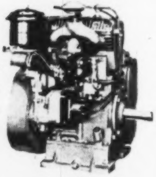
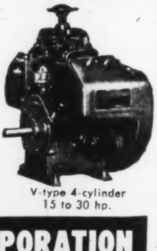


Single Cylinder, 2 to 9 hp.



Two Cylinder, 7 to 13 hp.



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MILWAUKEE 14, WISCONSIN

January 14

Ia., Manchester—Delaware Co., Manchester, hospital, $342,043. Charles Altfillisch, 126 W. Water St., Decorah, archt. CD 7/26—ENR 8/5.

January 15

Ga., Atlanta—City Bd. Educ., City Hall, E. P. Johnson School. Over $250,000. Stevens & Wilkerson, 157 Luckie St. N. W., archts. CD 10/26—ENR 11/11.

January 20

N. C., Taylorsville—Alexander Co. Hospital Assoc. Inc., Ray A. White, pres., 28-bed hospital. Over $250,000. Plans deposit $25. J. N. Pease & Co., Inc., 119½ E. 5 St., Charlotte, archt.

January 26

N. C., Boone—Appalachian State Teachers College, Boone, 2 story, 80x140 ft. laundry, garage and machine shop. $100,000. Northrup & O'Brien, Reynolds Office Bldg., Winston-Salem, archts.

LOW BIDDERS

Calif., Los Angeles—City, Bd. P. Wks., 153 City Hall, Dec. 22, shop bldg. and steam cleaning plant, from R. J. Daum Constr. Co., 6803 West Blvd., Inglewood, **$634,566.** Est. $520,000, CD 11/24—ENR 12/2.

●†Tex., Houston—Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C., rejected bids Nov. 30, veterans hospital, Inv. No. Eng-41-243-49-9. L. B. **$17,788,000.** Project abandoned. CD 12/7—ENR 12/9, under LB.

CONTRACTS AWARDED

California — State Div. Architecture, Pub. Wks. Bldg., Sacramento, six 1 story, rein.-con. armories at Azusa, Compton, Colton, Lynwood, Monrovia, and Vista, to Haddock Engineers Ltd., Box 479, Oceanside, **$455,700.** CD 11/24—ENR 12/2.

●Calif., Los Angeles—Bd. Educ., 1425 S. San Pedro St., Central Valley Area Junior High School, Bakeman Ave. and Van Owen St., North Hollywood Dist., to Baruch Corp., 5655 Wilshire Blvd., **$1,487,920.** Bids 12/17, awarded 12/20, CD 12/30—ENR 12/30, under LB.

Calif., Vallejo—Solano Co., Courthouse, Fairfield, 2 story, rein.-con. branch county office, to J. A. Bryant, 1851 Capitol Ave., **$288,426.** Bids 12/20. CD 12/9.

●O., Lakewood—Lakewood City Hospital, Detroit and Belle Aves., 4 and 6 story brick, stone, rein.-con. hospital addn., incl. boiler houses, ambulance bldg., service bldgs., etc. to Schirmer-Peterson Constr. Co., 6830 Beaver Ave., Cleveland, **$2,423,815.** CD 11/19—ENR 11/25, under LB.

Ont., Toronto—Municipality, concrete, brick, rein.-con. transformer station, to W. Cecie & Son, 269 Leslie St., Est. over **$50,000.** A. E. Salsbury, c/o owner, archts., Toronto Electrical Comn., Toronto, engr.

COMMERCIAL BUILDINGS

BIDS ASKED

January 15

Ind., Culver—Culver Military Academy, Culver, academy imprvs., incl. addns., alterations to Maxinkucke Inn, frame, concrete block addns., 2 story, 33x43 ft. and 30x15 ft. and 1 story, 14x84 ft., incl. 2 story, 40x150 ft., concrete block 30 room guest unit. Wedemeyer & Hecker, Cotton Belt Bldg., 111 N. 4 St., archts. CD 6/9—ENR 6/17.

January 21

Tex., Corpus Christi—First Baptist Church Congregation, 801 Mesquite St., church. $675,000. Phelps & DeWees & Simmons, 1501-06 Majestic Bldg., Corpus Christi, archts. W. E. Simpson, 935 Milam Bldg., San Antonio, engr. CD 8/18—ENR 8/26, under LB.

January 27

Minn., Minneapolis—Holy Cross R. C. Parish, Rev. V. W. Worzalla, 1621 University Ave. N. W., general contract 2 story, bsmnt. school and community center, 1630 N. E. 4 St. $400,000. G. W. Shifflet, 17 W. Franklin Ave., archt. CD 2/11—ENR 3/14.

●Pa., Clearfield—Clearfield Hospital, Clearfield, 4 and 5 story irregular shape, brick, steel hospital, $1,219,718. Chatfield & Schlicher, 324 W. Chelton St., Phila., archts. CD 11/30—ENR 12/2.

LOW BIDDERS

Calif., Claremont—Claremont Men's College, Claremont, Dec. 15, 35 x 98 ft. cement block administration bldg., 2 story, rein.-con. Dormitory Bldg. 3, from Wm. C. Crowell Co., 170 E. California St., Pasadena, **$383,500.** CD 12/13—ENR 12/16.

Calif., Lodi—Lodi Memorial Hospital Assn., 200 W. Pine St., Dec. 21, 3 story, rein.-con., 46-50 bed hospital, from Barrett & Hilp, 918 Harrison St., San Francisco, **$749,000.** CD 12/16—ENR 12/23.

Tex., Beaumont—J. Weingarten, Inc., 808 Prairie St., Houston, cancelled bids to have been opened Dec. 30, foods store. **$250,000.** CD 12/21—ENR 12/23.

CONTRACTS AWARDED

Mich., Detroit—Dunitz Bros., 1210 David Stott Bldg., five 1 story and one 2 story stores, to A. J. Etkin Constr. Co., 13336 Livernois St., Est. **$500,000.** Awarded 12/8.

●N. J., Trenton—Brookville Apartments, Inc., Market Street Natl. Bank Bldg., Phila., Pa., apartment development, Riverside Dr., to Sands Constr. Co., Market St. Natl. Bank Bldg., Phila., Pa. Approx. **$1,250,000.** W. H. Thomas, 117 S. 17 St., Phila., Pa., archt.

●**N. J., Vineland**—Harry Spiegel, Almond Rd., Norma, apartment development, Chestnut Ave., separate contracts. **$1,000,000.** Edwards & Green, Broadway and Carman St., Camden, archts. John A. Fletcher, 547 Landis Ave., assoc. archt.

●**Okla., Tulsa**—University of Tulsa, 600 S. College St., John E. Mabee and Lottie Jane Mabee dormitories, University of Tulsa, to A. L. Ward, 2880 E. 8 St. Est **$1,000,000.** Awarded 12/17. Atkinson & Murray, Thompson Bldg., archts. CD 10/6/44—ENR 10/19/44.

●**Pa., Pittsburgh**—Montefiore Hospital, 5 Ave., 12 story, 50x1414 ft., brick, stone, steel nurses home and hospital addn. 3459-5 Ave., to Branna Constr. Co., Bessemer Bldg., 6 St. Est. **$1,990,900.** Bids 12/9. CD 12/15—ENR 12/23, under LB.

INDUSTRIAL BUILDINGS

BIDS ASKED

January 13

Minn., Rochester—GARAGE, etc.—Peoples Co-operative Power Assn., H. C. Blumentritt, Rochester, 1 and 2 story, brick garage-office-warehouse bldg. $115,000. Plans deposit $5. Long & Thorshov, 400 Metropolitan Life Bldg., Minneapolis, archts. CD 8/27—ENR 9/9.

January 15

Okla., Woodward—POWER PLANT—Western Electric Co-operative, Anadarko, 75x90 ft. power plant and 1,000 hp. diesel engine generator unit. $100,000. Plans deposit $25. J. F. Huitt, 6525 Clayton St., Clayton, Mo., engr. CD 10/22—ENR 11/4.

January 18

Mo., St. Louis—PLANT—Anheuser-Busch, Inc., 21 Pestalozzi St., Zone 18, demolition, concrete and cement work, masonry, structural steel alterations to bsmnt. and 7th floors of beer bottling plant, air-conditioning, etc., Broadway and Pestalozzi St. Extended date. Frederick Dunn, 1218 Olive St., Zone 3, archt. CD 12/10—ENR 12/16.

CONTRACTS AWARDED

●**Pa., West Mifflin**—PLANT—Continental Can Co., 100 E. 42 St., New York, N. Y., 1 story, steel can mfg. plant, to Wigton Abbott Corp., 1225 South Ave., Plainfield, N. J. Est. **$1,500,000.** CD 10/17/45—ENR 10/25/45.

UNCLASSIFIED

BIDS ASKED

January 12

Miss., Tupelo—BATH HOUSE—State Bldg. Comn., Jackson, bath house at Tombigbee State Park. Plans deposit $10. Robert D. McKnight, Tupelo, archt.

March 15

●†**Oregon** — RAILROAD RELOCATION — U. S. Eng., Pittock Block, Portland, S.P. & S.R.R. relocation on Station 5751-6305, McNary Dam. $4,000,000-$6,000,000. CD 11/19—ENR 11/25.

LOW BIDDERS

N. J., Atlantic City — COMFORT STATIONS — Bd. Comrs. Atlantic City, 2 comfort stations, Convention Hall Plaza, from Anthony P. Miller, Inc., 3333 Arctic Ave., **$96,900.** George P. Swinton, city engr. CD 3/10—ENR 4/1.

●†**Oregon**—RAILROAD RELOCATION—U. S. Eng., Pittock Block, Portland, cancelled bids to have been opened Jan. 14, relocation S. P. & S. R. R., McNary Dam, Eng.-35-026-49. **$1,000,000-$2,000,000.** CD 11/19—ENR 11/25.

Tex., San Antonio — SWIMMING POOLS, etc. — Northview Country Club, c/o Joe Kaplan, chn. Bldg. Comn., 515 S. Comal St., Dec. 22, 2 concrete swimming pools, filters, water supply well, sewage disposal sys., driveways, clubhouse, from Howard Bumbaugh & Co., 102 Grandview Pl., **$127,638.** Est. $85,000. CD 12/10—ENR 12/16.

●**Ont., Hamilton** — WHARF — Dpt. P. Wks., Hunter Bldg., Ottawa, Dec. 22, Terminal Wharf 2, from McNamara Constr. Co. Ltd., 42 Industrial St., Leaside, Approx. **$1,135,364.** R. Blais, c/o owner, engr. CD 12/9—ENR 12/16.

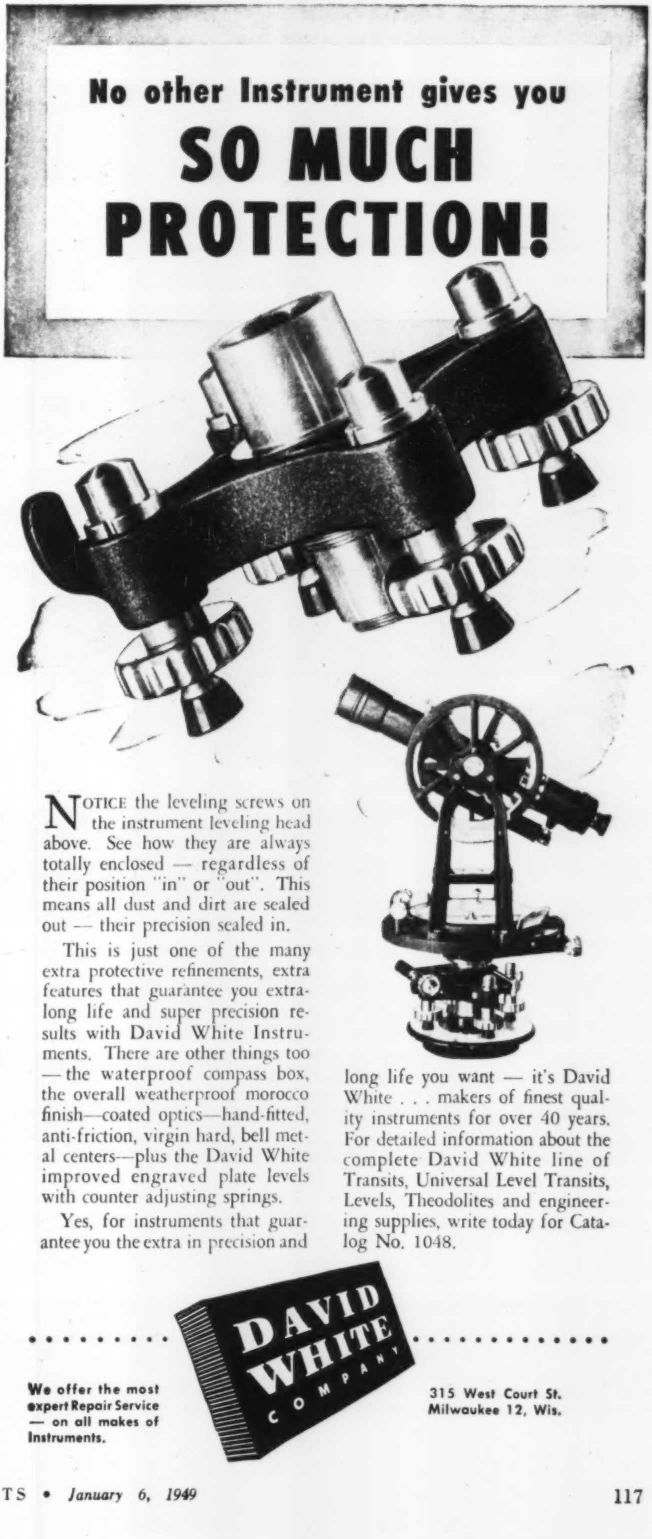
CONTRACTS AWARDED

Conn., Middletown — PLAYGROUND IMPRVS. — City, Playground Imprvt. Comn., C. A. Schaefer, chn., concrete block bldgs., rest rooms for boys and girls, Otis, Hubbard and Palmer Playgrounds, to D. and L. Constr. Co., 96 Henry St., Hartford. Est **$50,000.** CD 12/27—ENR 11/4.

Ill., Chicago — SUBWAY EQUIPMENT—City, Dpt. Purchases, Supplies & Contracts, City Hall, furnishing, installing signal and interlocking equip. Contr. T-10, Dearborn St. Subway, to Union Switch & Signal Co., 122 S. Michigan Ave., **$514,750.** CD 7/7—ENR 7/15, under LB.

Montana — RURAL DISTRIBUTION LINES — Tongue River Electric Co-operative, Custer, labor only, 142 mi. rural distr. lines, Yellowstone Co. to Williston Constr. Co., Williston, N. D., **$50,888.** Morrison Eng. Co., Helena, engr.

●†**N. M., White Rock**—CAMP SITE IMPRVS.—U. S. Atomic Energy Comn., Los Alamos, camp constr., Inv. No. 291-49-4, to Shaw & Estes, 1407 S. Akard St., Dallas, Tex., **$2,383,346.** Bids 12/7. CD 12/14—ENR 12/23, under LB.



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CONSTRUCTION REPORTS Second Section

WATER SUPPLY

BIDS ASKED

January 10

Pa., Ambler—Ambler Boro, water pipeline extens. Over $28,000.

Ont., Bowmanville—A. J. Lyle, city clk., City Hall, 1 mi. 6 in. watermain. Over $40,000. Proctor, Redfern & Laughlin, 11 Jordan St., Toronto, engrs. CD 11/30/45—ENR 12/13/45.

January 14

Wash., Westport—Town, Town Hall, drilling 5 wells, installing 39,000 ft. 4- to 10-in. pipe and constructing 150,000 gal. elevated steel storage tank. Approx. $28,000. A. K. Stillman, Chambers Bldg., engr. CD 7/1—ENR 7/22.

January 18

La., Angola—State Div. Admin., 201 Capitol Annex, Baton Rouge, removing 1 m.g. steel reservoir from Camp Livingston and re-erecting reservoir on foundation prepared by State Penitentiary.

Minn., Anoka—State Dpt. Admin., P. T. Peterson, dir. Purchases, 19 State Capitol, St. Paul, labor, materials for water distr. sys. addns., alterations, at Anoka State Hospital, $50,000. R. D. Thomas & Assoc., 400 Metropolitan Life Bldg., Minneapolis, engrs. CD 6/2—ENR 6/10.

Okla., Henryetta—City Clerk, City Hall, 750,000 gal. elevated water tank, $65,000. L. M. McGoodwin, Fayetteville, Ark., engr.

January 19

Kan., Holton—City, water treatment plant and present plant addn. $30,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., engrs. CD 10/2/46—ENR 10/17/46.

January 20

✦La., New Orleans—U. S. Eng., 606 Santa Fe Blvd., Galveston, Tex., water supply at Camp Le Roy Johnson, Serial No. Eng., 41-243-40-174. $35,000.

January 26

Tenn., Nashville—At office E. B. Smith, city purch. agt., City Hall, for West Nashville concrete reservoir, appurtenances. Plans deposit $25. Chester Engineers, 210 East Park Way, Pittsburgh 12, Pa., engrs. CD 12/1—ENR 12/23.

LOW BIDDERS

Calif., San Francisco—Pub. Utilities Comn., City Hall, Dec. 22, reconditioning portion of pipeline, Spec. 504, from American Pipe & Constr. Co., 1630 Webster St., Oakland, **$64,869.** CD 12/21—ENR 12/30.

Minn., St. Louis Park—Village, J. Justad, clk., Dec. 20, furnishing, erecting (1) 500,000 gal. overhead water tank (2) 1 m.g. tank, from Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia., **(1) $87,635 (2) $164,500.** CD 11/24—ENR 12/2.

N. J., Camden—City, City Hall, watermains Whitman and Haddon Aves., from Hughes Constr. Co., Frazer St., Trenton, **$44,401.** CD 6/18—ENR 7/7.

Tex., Kermit—City, Fred W. Pearson, mayor, Dec. 21, WW imprvs., incl. pump. station and bldg., setting pump. station and piping at 2 existing pump stations, from Wilks, Dake & Steed, Tyler, **$36,722.** Est. $50,000. CD 12/7—ENR 12/9.

CONTRACTS AWARDED

Ark., Hot Springs—City, water supply lines, to S. E. Evans Constr. Co., 2914 North O St., Ft. Smith, **$275,789.** Awarded 12/15. CD 9/23/47—ENR 9/25/47.

Kan., Hayes—City, City Hall, water supply line from river to city, to American Cast Iron Pipe Co., 916 Walnut St., Kansas City, Kan., **$260,000.** CD 9/22—ENR 10/14.

N. C., Macclesfield—Town, water and sewer, to T. A. Loving & Co., Bank of Wayne Bldg., Goldsboro, **$66,094.** Bids 8/5. L. E. Wooten, 712 Capital Club Bldg., Raleigh, engr.

Ore., Milwaukie—City, City Hall, 1½ m.g. water reservoir, to E. E. Settergren, Henry Bldg., Portland, **$64,908.** Bids 12/13, awarded 12/20. CD 12/22—ENR 12/30, under LB.

W. Va., Shinnston—City, approx. 8 mi. 12 in. c.i. pipe from Monongah to here, to East Penn Constr. Co., Landisville, Pa., **$90,313.** Bids 12/1. CD 12/15—ENR 12/23, under LB.

Wis., Rothschild — Village, elevated water tank to Pittsburgh-Des Moines Steel Co., 38 S. Dearborn St., Chicago, Ill., **$30,800.** Bids 12/13.

SEWERS, WASTE DISPOSAL

BIDS ASKED

January 10

N. Y., Brooklyn—President Brooklyn Boro, Boro Hall, Zone 2, removing, disposing silt and sludge from 108 in. sewer in 3 Ave. between 43 and 20 Sts.; dredging Gowanus Canal.

Ont., Bowmanville—A. J. Lyle, clk., City, City Hall, 1 mi. sanitary swers. Over $50,000. Proctor, Redfern & Laughlin, 11 Jordan St., Toronto, engrs. CD 1/29/47 ENR 2/20/47.

January 11

Mo., Clayton (St. Louis, 5, P. O.)—City, Miss Charlee Niedner, clk., City Hall, 10 N. Bemiston St., relief storm sewer, involving 12- to 21-in. vitr. clay and from 24- to 72-in. rein.-con. pipe. $300,000. Plans deposit $10. Horner & Shifrin, 803 Shell Bldg., 1221 Locust St., St. Louis, Zone 3, engrs. CD 10/1 ENR 10/28.

January 12

Pa., Phila.—Dpt. P. Wks., City Hall Annex, intercepting sewer along Pennypack Creek, SD-130 N E. Approx. $250,000. A. Zane Hoffman, c/o owner, ch. engr. CD 3/1/46—ENR 3/21/46.

January 13

Wis., Milwaukee — Metropolitan Sewerage Comn. of Milwaukee, Jones Island, 2,541 ft. 24 in. vitr. clay main sewer in W. Mill Rd., 99 vertical ft. standard and 51 vertical ft. drop manholes, $125,000; 992 ft. 21 in. vitr. clay intercepting sanitary sewer, N. Hopkins Rd., 50 vertical ft. standard manhole, $50,000. Plans deposit $5 each. J. L. Ferebee, c/o owner, ch. engr. CD 12/4/43—ENR 12/9/43.

January 30

✦Va., Fort Monroe—U. S. Eng., First and Douglas Sts., N.W. Wash. 25, D. C., sanitary sewerage sys. alterations, extens., Serial No. Eng-49-080-49-67 (17) M. Extended date.

February 1

Calif., Chico—City, City Hall, South Chico sewer drainage sys. $105,000; North Chico drainage sys., $171,000. Extended date. Plans deposit $20. Martin C. Polk, city engr. CD 12/21—ENR 12/23.

LOW BIDDERS

Md., Towson—Baltimore Co., Court House, Dec. 17, 700 lin. ft. 60 in. RCCPX, 200 lin. ft. 66 in. RCCPX 1,565 cu. yd. Class 1A concrete, 525 lin. ft. 6- to 15-in. VCPX, Contr. 142D, from Frank Angelozzi Constr. Co., 123 S. Hight St., Baltimore, **$175,807.**

Okla., Henryetta—City, City Hall, Dec. 14, sewage disposal plant, from Lippert Bros. Co., 2800 N. Santa Fe St., Oklahoma City, **$88,750.** Est. $77,000. CD 12/8.

Pa., Phila.—Dpt. P. Wks., City Hall Annex, Mill Creek Sewer reconstruction, from Robert Lombardi, Old Real Estate Bldg., Broad and Chestnut Sts., **$368,294.** A. Zane Hoffman, c/o owner, ch. engr. CD 3/22/45—ENR 3/29/45.

Tex., Bloomington—Victoria County Water Control & Imprvt. Dist. 1, Dec. 20, Contrs. 1 and 2, sewage collection sys., from Gerald Mora, 312 Sabine St., Houston, **$51,721,** est. $60,000; Contr. 4, sewage treatment plant, from Contractors Associates, Inc., Port Lavaca, **$53,534,** est. $50,000. CD 12/7—ENR 12/9.

Tex., Lubbock—City, Dec. 20, sanitary sewer imprvs., from Lancaster & Shields, 5438 Morningside Dr., Dallas, **$128,803.** CD 12/8.

CONTRACTS AWARDED

Mass., Taunton—City, Frederick S. Smith, chn. Sewer Comn., City Hall, sewage disposal works, treatment facilities, pump. station, incl. 1,800 ft. 10 in. sewer force main, 500 ft. 39 in. outfall sewer and appurtenances, to Gil Wyner, 12 Newlands St., Malden, **$970,906.** Bids 11/8. CD 11/15—ENR 11/18, under LB.

Okla., Tulsa—City, City Hall, Cincinnati Ave. sanitary relief sewer, to Paris Cement Constr. Co., 1540 N. Yale St., **$55,925.** Est. $60,000. W. R. Wooten, city engr. CD 2/3—ENR 2/19.

●R. I., Cranston—City, H. W. Lark, mayor, City Hall, 3½ mi. 8- to 24-in. sewer mains, 1,700 ft. 24 in. force main and 12 mi. 8- to 12-in. sewer mains, 7¾ mi. service connecting sewers, various streets, to Rocco Zoppo, 44 Ramsdell St., Roslindale, Mass., **$894,627** and **$1,146,480** respectively. CD 12/9—ENR 12/16 and CD 10/14—ENR 10/21.

Que., Quebec City—Municipality, sewer in Commissioners St. South, day labor. **$75,000.** Ed Hamel, city engr.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks $28,000; other public works $50,000; industrial buildings $68,000; other buildings $250,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.;

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

✦	Federal Government
●	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

January 11
Kansas
January 13
New Jersey
January 14
Kentucky

January 18
Minnesota
and Wisconsin
Wisconsin
January 20
Virginia

January 24

Pennsylvania and New Jersey—Delaware River Joint Comn., Camden Plaza, Camden, N. J., Contr. 2, Delaware River Bridge roadway, lighting sys., Phila., Pa. and Camden, N. J. Over $50,000. Bids 10/27 rejected, L. B. **$290,000.** CD 12/1—ENR 12/9, under L. B.

February 2

✦Md., Chesapeake City—U. S. Eng. 121 North Broad St., Phila. 1, Pa., approach roads for Chesapeake City Bridge, Chesapeake and Delaware Canal, approx. 6 mi. south of Elkton, Md. and 24 mi. southwest of Wilmington, Del.

February 3

Tenn., Chattanooga—City, repairing Walnut Street Bridge. $360,000. Plans deposit $25. Extended date. Peerson & Hedman, Chattanooga Bank Bldg., engrs. CD 10/27—ENR 11/4.

LOW BIDDERS

California—State Div. Hys., Sacramento, Dec. 22, steel truss swing bridge with rein-con., timber trestle approach spans across Mokelumne River about 2 mi. north of Thornton, San Joaquin and Sacramento Counties, from Lord & Bishop, Box 812, Sacramento, **$244,852.** CD 11/29—ENR 12/2.

Illinois—State Hy. Dpt., Springfield, rejected bids Sept. 10, bridge, widening existing bridge, St. Route 143, Massac Co. L. B. **$53,738.** CD 9/16—ENR 9/23, under LB.

Louisiana—State Hy. Dpt., Baton Rouge, Dec. 22, four 30 ft. and one 50 ft. I-beam span, Bayou Teche Bridge (Cecelia), bit. surf. 0.09 mi. approaches, State Route 25 S. P. 56-05-03, St. Martin Parish, from Forcum James Inc., 1565 Choctaw Dr., Baton Rouge, **$96,996;** one 50 ft. vertical lift span and seven 27 ft. fixed I-beam approach span, Bayou Teche Bridge (Parks), bit. surf. 0.118 mi. approaches, State Route 361, S. P. 400-30-06, St. Martin Parish, from Austin Bridge Co., 1000 Singleton Blvd., Dallas, Tex., **$201,999.** CD 11/24—ENR 12/2.

Nebraska—State Dpt. Roads & Irrigation, Lincoln, Dec. 16, culverts, 2 railroad subways, one combined highway bridge and railroad subway, 2 highway bridges, c. conc., surf. FA-UG-3 Grand Island, from Bushman Constr. Co., 5 and Felix Sts., St. Joseph, Mo., **$973,111.** CD 11/29—ENR 12/2.

Virginia—State Hy. Dpt., Richmond, rejected bids Dec. 14, bridge over Popler Creek and 0.75 mi. macad. paving, Wythe and Carroll Counties. L. B. **$94,675.** CD 12/17—ENR 12/23, under L. B.

CONTRACTS AWARDED

Louisiana—State Hy. Dpt., Baton Rouge, 11 span Bayou Plaquemine Bridge, over Bayou 0.403 mi., S. P. 50-06-10, F. A. P. F. 339 (2), Iberville Parish, to Austin Bridge Co., 1000 Singleton Blvd., Dallas, Tex., **$670,884.** Bids 12/8, awarded 12/23. CD 12/17—ENR 12/23, under L. B.

Minnesota—State Hy. Dpt., St. Paul, Bridge 5895, 3rd contract, over Mississippi River in Hastings, S. P. 1913-06 (TH 61-3), U 307 (15), to Clinton Bridge Co., Clinton, Ia., **$924,672;** Bridge 6525 near Randolph, S. P. 2508-05 (TH 56-116), F 917 (4), to L. M. Feller Co., Rochester, **$91,997.** Bids 12/17. CD 12/2—ENR 12/9.

Oregon—State Hy. Comn., Salem, 110 ft. rein.-con. viaduct; paving 0.27 mi. roadway, Devils Lake Outlet Sect., Oregon Coast Hy., Lincoln Co., to Lindstrom Bros., 7335 N. E. Fway., Portland, **$124,711.** Bids 12/20. CD 12/9.

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

January 11
Kansas
January 14
Kentucky
January 18
Wisconsin

January 19
California
January 20
Virginia
January 26
Louisiana

FOUNDATIONS

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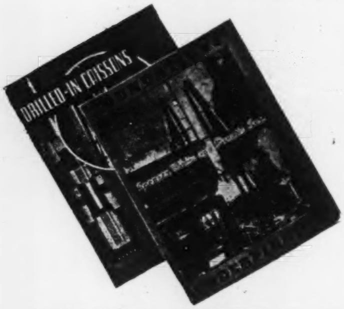
CONCRETE-STEEL PILES
MASS CONCRETE CONSTRUCTION
HEAVY SHORING
DRILLED-IN CAISSONS



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January 10

N. Y., New York—President Manhattan Boro, Municipal Bldg., Zone 7, asph., c. conc. Eldridge St., Delancey to Rivington Sts.; Horatio St., Greenwich to 8 Aves.; Mulberry St., Park to Bayard Sts.; Mulberry St., Canal to Broome Sts.; Mulberry St., Spring to Houston Sts., Suffolk St. Delancey to Rivington Sts., etc.

January 18

Minn., Wayzata—Hennepin Co., R. F. Fitzsimmons, aud., Minneapolis, c. conc. 0.305 mi. Lake St. between Barry and Broadway Aves., S. P. 27-501-02 (SAR 7), Minn., Proj. S 22 (1), $50,000. Plans deposit 70c. L. P. Zimmerman, co. hy. engr.

February 10

+Montana—Bureau Reclamation, Dpt. Interior, Sheridan, Wyo., streets, sewer, water and electrical distr. sys., Moorhead Dam Government Camp, 5 mi. south Moorhead, Missouri Basin Proj., Powder River Unit, Extended date. CD 9/14—ENR 9/16.

LOW BIDDERS

Calif., San Francisco—Dpt. P. Wks., City Hall, Dec. 22, track removal and reconstr. pavement portions Hayes, Stanyon and Polk Sts., from Eaton & Smith, 715 Ocean Ave., **$208,374.** CD 12/10.

†Idaho—Pub. Rds. Admin., 609½ Bannock St., Boise, Dec. 10, bit. 8.054 mi., constructing concrete bridge, Salmon-Montana Line Hy. Salmon National Forest, Idaho Forest Hy. Proj. 30-G2, H2, Unit 2, Lemhi Co., from Jack C. Olson, Rigby, **$188,797.** CD 11/29—ENR 12/2.

+Minnesota—P. Wks. Admin., 1113 Main Post Office Bldg., St. Paul, Dec. 17, constr. Forest Hy. Proj., Cook Co., from Farrell Contrg. Co., 1607 Wynne Ave., St. Paul, **$289,630.** CD 12/2—ENR 12/9.

New Jersey—State Hy. Dpt., Trenton, Dec. 22, wid'n White Horse Pike access route to Atlantic City, Rt. 43, Sect. 13B, Atlantic Co., from J. R. Williams Co., 51 N. Woodbury Rd., Pitman, **$211,848.** CD 12/2—ENR 12/9.

New Jersey—Spencer Miller Jr., comr. State Hy. Comn., Trenton, Dec. 28, imprv. 0.7 mi. Federal St. between Haddon Ave. and Cooper River, Camden Co. from Francis A. Canuso & Son, 804 S. 12 St., Phila., Pa., **$299,920;** surfacing 4.7 mi. Tilton Rd. from Rt. 4 southeast of English Creek-Port Republic Rd. in Northfield and Egg Harbor Twp., Atlantic Co., from A. J. Cunningham & Sons, 370 Newkirk Ave., Trenton, **$175,495.** CD 12/9—ENR 12/16.

Oregon—Oregon Hy. Comn., Salem, Dec. 20, widening 4.62 mi., surfac. 15.93 mi. Prineville-Eagle Rock sect. Pauline Secondary Hy., Crook Co., from C. W. Thomas, Builders Exch. Bldg., Portland, **$54,012.** CD 12/9.

CONTRACTS AWARDED

+Montana—Pub. Roads Admin., 342 Post Office Bldg., Missoula, clearing, grubbing, grading 2.628 mi., surf. 16.375 mi. Lewis and Clark Hy., Lolo National Forest, Montana Forest Hy. Proj. 11-CD, D1, Missoula Co., to Union Constr. Co., Missoula, and F. & S. Contg. Co., 1300 Chicago St., Butte, **$224,803.** Bids 12/21. CD 12/9.

Montana—State Hy. Dpt., Helena, gravel road mix oiling 7.3 mi. Fort Benton Havre Rd., Chouteau Co., to Nilson-Smith Co., 812 2 St. S., Great Falls, **$111,217. (Correction—price).** CD 12/23—ENR 12/30, under CA.

New York—B. D. Tallamy, supt. Dpt. P. Wks., Albany, c. conc. 3.74 mi. Route 31 from Monroe Co. line eastward through Macedon, Wayne Co., to Bero Eng. & Constr. Corp., McKinley Bldg., Buffalo, **$508,565.** Bids 11/10. CD 11/12—ENR 11/18, under LB.

S. C., Columbia—City, paving, imprv. various streets, to Cherokee, Inc., Box 1296, **$288,342.** Bids 12/21. CD 12/14—ENR 12/16.

EARTHWORK, WATERWAYS

BIDS ASKED

January 12

La., Houma—Terrebonne Parish Police Jury, Houma, drainage proj. involving 1,548,000 cu. yd. channel excav., 53 acres clearing and grubbing.

+Pennsylvania—U. S. Eng., Standard Oil Bldg., Baltimore 2 Md., levee raising and seepage control sys. at Kingston, Luzerne Co., Eng-18-020-49-35. $150,000-$250,000. Extended date. CD 12/10—ENR 12/16.

January 13

+Washington—Bureau Reclamation, Dpt. Interior, Ephrata, earthwork and concrete lining for PPW-4.3 wasteway, Pasco pump laterals, Columbia Basin Proj., Spec. R1-CB-4.

January 14

+Oregon—U. S. Eng., 19 E. Poplar St., Walla Walla, Wash., furnishing steel sheet piling and steel tee piling for McNary Dam, Serial No. Eng-45-164-49-15.

January 15

+Georgia and South Carolina—U. S. Eng., Post Office Bldg., Savannah, Ga., furnishing del. f.o.b. Uchee S. C., addnl. penstock intake gates with guides and seals, Savannah River Basin, Savannah River, Inv. No. Eng.-09-133-49-82, $100,000-$200,000.

January 20

†Georgia and South Carolina—U. S. Eng., Post Office Bldg., Savannah, Ga., clearing reservoir, Group 1-A, Clark Hill Proj., Savannah River Basin, Savannah River, Inv. No. Eng.-09-133-49-89. Bids 11/23 rejected. CD 12/2—ENR 12/9.

January 21

†Oregon-California — Bureau Reclamation, Dpt. Interior, Klamath Falls, earthwork, Station 50 plus 00 to Station 592 plus 75, Klamath Straits Drain Outlet enlargement, Modoc Unit, Tule Lake Div., Klamath Proj., Spec. 2509.

January 25

†Arkansas—U. S. Eng., 300 Broadway, Little Rock, Arkansas River Watershed, levee and drainage structure, Little Rock to Pine Bluff (Head of Fourche Island to Pennington Bayou), Arkansas River, Serial No. Eng-03-050-49-29.

†California—Bureau Reclamation, Dpt. Interior, Redding, completing Keswick Dam and Power Plant on Sacramento River, Spec. 2479. Extended date, CD 11/24—ENR 12/9.

†South Dakota—Bureau Reclamation, Dpt. Interior, Moorcroft, Wyo., street surf., sewerage, water and electrical distr. sys.; constructing residence, office and bunkhouse, metal laboratory and warehouse and snop moving, erecting seven Wingfoot residences for Keyhole Dam Govt. Camp, Missouri River Basin Proj., Spec. R6-23 (Region 6).

January 26

†Kentucky—U. S. Eng., P. O. Box 1070, Nashville, Tenn., furnishing, del. f.o.b. cars at Danville, 10 main power transformers, appurtenances, Wolf Creek Reservoir, Serial No. Eng. 40-058-49-56. $750,000-$1,250,000. CD 6/9/41—ENR 6/12/41.

Pennsylvania—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, Chapman Dam on Tionesta Creek, Pleasant Twp., Warren Co. $300,000. Plans deposit $10. A. F. Jones, c/o owner, ch. engr.

February 1

†Colorado—Bureau Reclamation, Dpt. Interior, Paonia, diversion works and earthwork and structures for enlargement Fire Mountain Canal, Station 4 plus 95.00 to Station 145 plus 00.00, Paonia Proj., Spec. 2518, work extends from point about 1½ mi. west of Somerset, to point 1½ mi. east of Bowie.

February 2

●†South Dakota—U. S. Eng., 1709 Jackson St., Omaha, Neb., outlet works, Schedule A, intake structures for Fort Randall Reservoir Proj. near Lake Andes, Serial No. Eng-25-066-49-162. $8,000,000-$12,000,000. CD 12/27—ENR 12/30, under LB.

About February 15

†North Dakota—U. S. Eng., Fort Lincoln P. O. Box 300, Bismarck, tunnels for Garrison Dam and Reservoir, Riverdale, Serial No. Eng-32-015-49-60. CD 6/1/44—ENR 6/15/44.

On or About February 17

†Georgia—U. S. Eng., P. O. Box 1169, Mobile 7, Ala., tailrace channel deepening at Allatoona Dam, Etowah River, Serial No. Eng-01-076-49-101.

LOW BIDDERS

Calif., San Francisco—Park Comn. of City and San Francisco Co., McLaren Lodge, Golden Gate Park, Dec. 22, repairing recreation pier at Aquatic Park, from Healy Tibbitts Constr. Co., 411 Brannan St., **$148,700.**

●†Louisiana and Mississippi—U. S. Eng., P. O. Box 1169 Mobile, 7, Ala., Dec. 22, Lock 3 on Pearl River, between Bogalusa and Pearl River, Inv. No. Eng.-01-076-49-61, from Maxon Constr. Co., Inc., 131 N. Ludlow St., Dayton, O. **$1,335,506.** CD 11/19—ENR 11/25.

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, Zone 2, Dec. 22, installing sector gates and operating machinery for Bayou Sorrel Lock on Lower Grand River, Iberville Parish, Serial No. Eng-16-047-49-155, from T. L. James & Co., Inc., Ruston, **$98,051.** CD 11/29—ENR 12/2.

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, Zone 9, Dec. 22, dredging approx. 2,600,000 cu. yd. material from channel of Vermillion River, Abbeville, Inv. No. Eng.-16-047-49-160, from Jahncke Service, Inc., 814 Howard Ave., New Orleans, **$414,960.** CD 12/8—ENR 12/16.

†Louisiana—U. S. Eng., foot Prytania St., New Orleans, Dec. 22, removal, disposal approx. 3,489,000 cu. yd. material from Calcasieu River and Pass, and 6x20 ft. connecting canal, Cameron Parish, Inv. No. Eng.-16-047-49-163, from Atlantic Gulf & Pacific Co., 15 Park Row, New York, N. Y., **$479,721.** CD 12/6—ENR 12/9.

†Nebraska—U. S. Eng., 601 Davidson Bldg., Kansas City, 8, Mo., Dec. 21, administrative facilities, Harlan County Dam, Republican River, Eng-23-028-49-114, from B. & G. Constr. Co., Carthage, Mo., **$107,540.** Est. $114,440.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, dredging Cape Fear River, at and below Wilmington, turning basin and Fourth East Jetty Channel, Eng-31-075-49-20, from Standard Dredging Co., 80 Broad St., New York, N. Y. **$209,286.** Est. $172,588. CD 12/8.

†Oregon and Washington—U. S. Eng., 628 Pittock Block, Portland 5, Ore., cancelled bids to have been opened Jan. 5, dredging side channel in Columbia River from approx. 5,500

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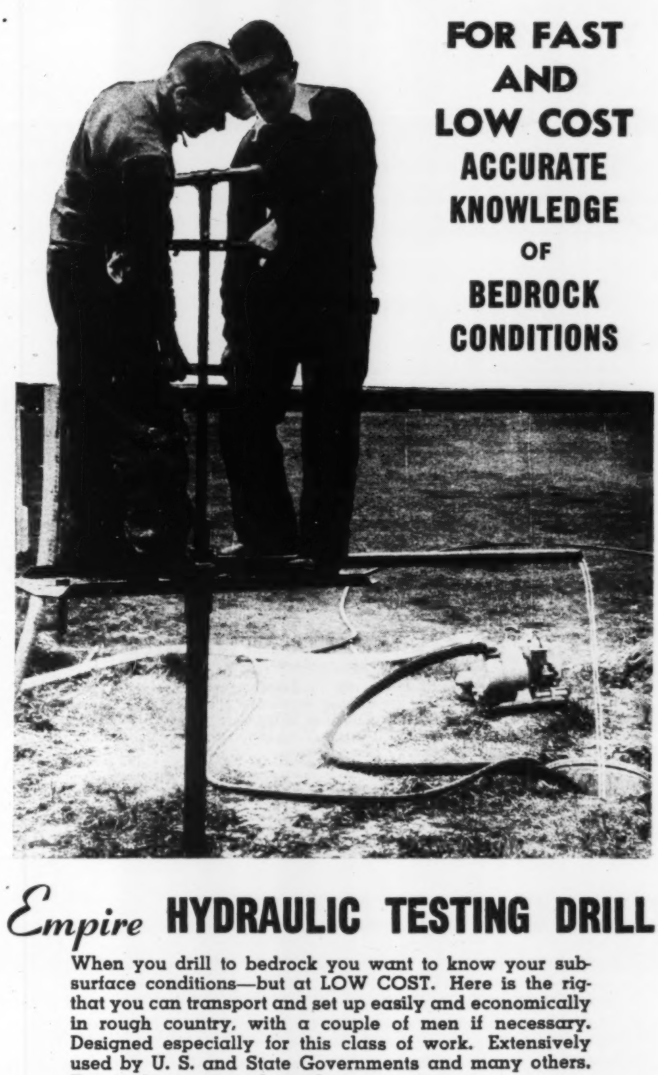

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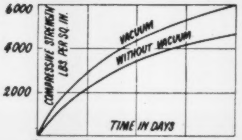

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CONTRACTS AWARDED

Ont., Wheatley (Muddy Creek) — Dpt. P. Wks., Ottawa, fishing harbour, to Woollat Constr. Co. Ltd., Ottawa St., Walkerville, Approx. **$61,998.** Bids 10/6. CD 9/23—ENR 9/30.

Que., Port Daniel—Dpt. P. Wks., H Bldg., Ottawa, Ont., fishing harbour, Charles Nadeau & Sons, Port Daniel, Appr **$49,822.**

Sask., Regina — Prairie Farm Rehabilitation Admin., George Spence, dir., 910 McCallum Bldg., irrigation tunnel, excavating, rein.-con. for St. Mary's River Dam Proj. approx. 40 mi. southeast of Lethbridge and 4 mi. northwest of Spring Coulee to Assiniboia Eng. Co. Ltd., 301 Beeson-Liehan Bldg., Calgary, Alta. Est. over **$900,000.** Bids 9/27. CD 9/7—ENR 9/9.

AIRPORTS AND AIRBASES

BIDS ASKED

January 10

N. Y., Idlewild—BORINGS—At office Chief Engineer Port of New York Auth., 111 Eighth Ave., New York, Zone 11, borings at New York International Airport. Contr. NYA-51, Queens Boro. CD 1/21/44—ENR 2/10/44.

January 12

†Va., Dam Neck — BOWLING ALLEYS — P. Wks. Office, Headquarters, Fifth Naval Dist., U. S. Naval Base, Norfolk, Zone 11, installing four government furnished bowling alleys in an existing building, etc. at Fleet Air Defense Training Center, Spec. 21321. Plans deposit $10.

January 17

†Tex., Corpus Christi—AIRPORT IMPRVS. —P. Wks. Dpt., Naval Air Station, Corpus Christi, resurf. asph. roads and drives, Naval Auxiliary Air Station, Cabaniss Field, Spec. 21293. Plans deposit $10.

January 18

Kan., Junction City—AIRPORT IMPRVS.—At office Joe M. Kinkade, city clk., City Hall, runways, landing strips, incl. clearing, grading, draining, fencing, seeding graded areas, etc., at Junction City Municipal Airport, northwest of city limits of here, Proj. No. 9-14-016-701. Plans deposit $10. Wilson & Co., 223 N. Santa Fe St., Salina, engrs. CD 8/29/45—ENR 9/6/45.

†Alaska — AIRPORT — U. S. Eng., Rialto Bldg., Seattle, Wash., two 20-man frame bachelor officers quarters, Inv. S95-507-49-3; seven 8-family frame quarters, Inv. S95-407-59-4, at Ladd Air Force Base. Plans deposit $150 each. Extended date. CD 12/1—ENR 12/9.

January 25

†Wash., McChord Field (br. Tacoma)—THEATER—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, theater, Serial No. Eng-45-108-49-93.

April 1

●†Alaska, Fort Richardson—OUTSIDE UTILITIES—U. S. Eng., (APO 942, c/o P.M., Seattle, Wash.) Anchorage, outside utilities. Est. $2,000,000-$4,000,000. CD 8/13—ENR 9/2.

PUBLIC BUILDINGS

BIDS ASKED

After January 1

Fla., Chipley—Bd. Comn., Washington Co., Chipley, hospital, $250,000. Ray Littlefield, Lake City, archt.

January 11

†Ga., Camp Gordon (P. O. Augusta)—U. S. Eng., Post Office Bldg., Savannah, rehabilitation bldgs., facilities, Station Hospital, Serial No. Eng-09-133-49-79. Extended date. CD 12/16—ENR 12/30.

N. Y., Brooklyn—New York City Housing Auth., 63 Park Row, New York, Zone 7, Nostrand Houses, Proj. NYC-11 in area bounded by Bragg St., Avenue V, Batchelder St. and Avenue X. Extended date. CD 12/9—ENR 12/16.

†Pa., Pittsburgh—U. S. Eng., 925 New Federal Bldg., grading, etc. Veterans Admin. Hospital for Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C. $750,000-$1,250,000. CD 11/29—ENR 12/2.

January 12

Kan., Norton—Norton Co., hospital, $300,000. Raymond Coolidge, New England Bldg., Topeka, archt. CD 5/27—ENR 6/10.

January 17

Fla., Ft. Pierce—St. Lucie Co. Bd. Pub. Instr., Ft. Pierce, school, $300,000, Wm. W. Hatcher, Ft. Pierce, archt.

January 19

†N. J., Trenton—Yards & Docks Annex, Navy Dpt., Arlington, Va., exhaust gas cooling equip. at Naval Aeronautical Turbine Laboratory, Spec. 21361.

†Alaska, Fort Richardson — U. S. Eng., Rialto Bldg., Seattle, Wash., steel, frame, masonry general depot warehouse, Inv. S 95-507-49-6; three 8-family NCO frame quarters, Inv. S 95-507-49-7; one 20 man bachelor frame officer quarters, Inv. S95-507-49-8. Plans deposit $150 each. Extended date. CD 12/1—ENR 12/9.

†Alaska, Whittier—U. S. Eng., Rialto Bldg., Seattle, Wash., 92x542 ft., steel frame warehouse on existing dock. Inv. 895-507-49-9. Plans deposit $150. Extended date. CD 12/1—ENR 12/9.

January 28

Minn., St. Cloud—State Dpt. Admin., P. T. Peterson, dir. Purchases, 19 State Capitol, St. Paul, central heating plant at State Teachers College. $250,000. Plans deposit $30. F. W. Jackson, St. Cloud, archt, F. V. Traynor, St. Cloud, assoc. archt. CD 10/17/47—ENR 10/30/47.

About February 1

●Tenn., Chattanooga—Hamilton County Memorial Hospital Assn., c/o Kaiser, Neal & Reid, archts., Keystone Bldg., Pittsburgh, Pa., hospital. $1,650,000. CD 2/16—ENR 3/4.

February 2

Pa., Woodville—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, general contract, heating, plumbing and electrical work for remodeling female mental buildings, Wards 1 to 8 (inclusive). $820,000. Plans deposit $10 each. P. Howard Sterling & Thomas B. Garman, 119 E. Montgomery Ave., Pittsburgh, Zone 12, archts. A. F. Jones, c/o owner, ch. engr. CD 8/25/47—ENR 9/4/47.

About February 15

●O., Columbus—Ohio State University, Columbus, student union bldg. $5,000,000. Bellman, Gillett & Richards, 518 Jefferson St., Toledo, archts. CD 9/2—ENR 9/9.

February 15

Minn., Bemidji—State Dpt. Admin., P. T. Peterson, dir. Purchases, 19 State Capitol, St. Paul, 3 story, brick, tile, laboratory at State Teachers College. $700,000. Lang & Raugland, 502 Wesley Temple Bldg., Minneapolis, archts. CD 10/17/47—ENR 10/30/47.

February 24

Fla., Jacksonville—City, general main bldg. for housing and operations of Power Plant 2, incl. numerous modern facilities; furnish and install miscellaneous electrical equip. and doing electrical work in connection with Power Plant 2, in South Jacksonville. Plans deposit $75 for each. Reynolds, Smith & Hills, 227 Park St., engrs.

LOW BIDDERS

Calif., Pasadena—Tournament of Roses Assoc., City Hall, Dec. 13, 9,000 seat rein.-con. addn. to Rose Bowl, from West & Douglass, Palm and Glenrose Sts., Altadena, **$357,726.** (**Correction**—low bid). CD 12/21—ENR 12/30, under L. B.

●Ia., Cedar Rapids—Bd. Educ., Administration Bldg., 346 2 Ave. S. W., Dec. 17, Cleveland school from James Leck Co., 211 S. 11 St., Minneapolis, Minn., **$400,860*****Dec. 6, Kenwood School, from Morehead Constr. Co., 217 Dows Bldg., **$484,898*****stadium, from R. W. Rinderknecht Co., 113 F Ave. N. W., **$577,000.** CD 12/8 and 10/29—ENR 11/4.

La., Opelousas—St. Landry Parish, School Bd., Opelousas, rejected bids Dec. 16, bldgs. at Morrow, Washington, Lawtell, Port Barre and Leonville Schools. Will readvertise. CD 11/23—ENR 12/2.

Md., Chestertown—Kent Co. School Bldg. Comm., J. Thomas Kibler, chn., Dec. 17, Chestertown High School and Garnet High School, Chestertown; Rock Hall High School addn., Rock Hall; Galena Elementary School, Galena, from Wm. F. Sutter, Nescopek, Pa., **$914,000.** CD 11/29—ENR 12/2.

Minn., Minneapolis—Hennepin Co., R. F. Fitzsimmons, aud., Dec. 21, general contract 3 story, bsmnt., 106 x 110 ft. courthouse addn., from Kraus-Anderson, Inc., 501 S. 8 St., **$398,000.** CD 12/1—ENR 12/9.

Minn., Rochester—Bd. Educ., S. P. Allen, clk., Rochester, Dec. 16, general contract, 2 schools, from Stocke & Olson, 438 Baker Bldg., Minneapolis, **$792,000.** CD 12/2—ENR 12/9.

Mo., Marshall—State, Dpt. P. Health & Welfare, Samuel Marsh, dir. State Office Bldg., Jefferson City, and John F. Powell, dir. P. Bldgs., State Capitol, Jefferson City, Dec. 17, brick, concrete boys' dormitory from Bennett Constr. Co., 329 Westport Rd., Kansas City, Mo., **$408,100;** rejected bids Dec. 17, 1 and 2 story, ground floor to be 55 x 66 ft., 1st floor to be 36 x 178 ft., and 30 x 55 ft., brick, concrete tubercular patient bldg., L. B. **$311,199,** at Missouri State School for Feeble Minded and Epileptics. CD 11/30—ENR 12/2 and CD 11/17—ENR 11/25.

N. M., Las Cruces—Dona Ana County and City, Dec. 18, city-county hospital, from C. H. Leavell & Co., 1900 Wyoming St., El Paso, Tex., **$360,292** base bid and **$563,608** complete. CD 12/7—ENR 12/9.

N. C., Laurinburg—Scotland County Memorial Hospital, Laurinburg, Dec. 17, general contract, hospital, from McKoy-Helgerson Co., P. O. Box 25, Greenville, S. C., **$578,000.** CD 11/24—ENR 12/2.

Okla., Stillwater—A & M College, c/o Bd. Regents, 433 Capitol Bldg., Oklahoma City, Dec. 14, home economics, from J. J. Bollinger, Braniff Bldg., Oklahoma City, **$303,300.** CD 12/7—ENR 12/9.

Pa., Norristown—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, Dec. 22, general contract renovating water sects. Ward Bldgs. 2, 3, 4, and 5 at Norristown State Hospital, from Wark & Co., 1700 Sansom St., Phila., **$376,540.** CD 11/29—ENR 12/2.

●Pa., Phila.—Bd. Educ., 21 and Winter Sts., Dec. 22, William L. Sayre Jr. High School, from McCloskey Homes, Inc., 1620 W. Thompson St., **$2,093,000.** CD 11/30—ENR 12/2.

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Tenn., Fowlkes—Dyer Co. Bd. Educ., Dyersburg, school, from Clayton Constr. Co., Dyersburg. **$293,715.**

Tenn., Nashville—City, Dec. 22, Washington Junior High School addns., from V. L. Nicholson Co., 611 S. Central St., Knoxville, **$289,500.** CD 12/6—ENR 12/9.

Tex., Austin—City, G. Morgan, mgr., Dec. 14, steam-generating units for power plant, from Combustion Eng. Co., 204 Madison Ave., New York, N. Y., **$506,113.** Est. $100,000. CD 11/30—ENR 12/2.

Tex., Beaumont — Beaumont Independent School Dist., Beaumont, Dec. 23, brick, hollow tile, Ogden School, concrete and steel frame and fdn., from Herman Weber Constr. Co., San Jacinto Bldg., **$295,535.** CD 11/24—ENR 12/2.

†Tex., Fort Bliss—U. S. Eng., P. O. Box 1538, Albuquerque, rehabilitation facilities for selective service, Eng-29-005-49-21, from R. D. Lowman, 1617 E. Missouri St., El Paso, **$193,170.** Est. $263,033. CD 11/4—ENR 11/11.

Wash., Pullman — School Bd., Pullman, Edison School, from H. Halvorson, Inc., Ziegler Bldg., Spokane, **$170,000.** Funk, Molander & Johnson, Sun Life Assurance Bldg., Spokane, archts.

Wis., Greenfield (P. O. Milwaukee) — School Dist. 8, 4639 W. Forest Home Ave., rejected bids Oct. 27, 2 story, bsmt, 66 x 135 ft. school. L. B. **$601,333.** Will readvertise. CD 11/3—ENR 11/11, under LB.

†T. H., Oahu—U. S. Eng., Fort Armstrong, Honolulu, Nov. 12, recreation facilities consisting of theater, swimming and wading pools at New Tripler General Hospital, Eng-94-612-49-2 (PWGIF), from Oahu Constr. Co. Ltd., Honolulu, **$363,400.** CD 10/29—ENR 11/4.

CONTRACTS AWARDED

Conn., Danbury—City, Fred W. Belmer, City Hall, 1 story, 75 x 172 ft. concrete, steel garage, Beaver Brook Sect., for Public Wks. & Water Dpts. motor vehicles and equip., to Bernard J. Dolan, 207 Greenwood Ave., Bethel Est. **$70,000.**

Conn., Storrs—State, Fred R. Zeller, comptroller, State Capitol, Hartford, brick, steel Ratcliffe Hicks Laboratory, University of Connecticut, to Brooklawn Constr. Co., 254 Prospect St., Hartford, **$184,956.** Bids 12/16. CD 11/26—ENR 12/2.

Fla., Jacksonville—City, 1 story, brick, concrete warehouse, Colorado Ave. and Iowa St., to Gallespie Constr. Co., Rogus Bldg., W. Monroe St., **$96,970.** Awarded 12/24. W. E. Shedden, city engr. CD 1/10/45—ENR 1/25/45.

Ill., Fairfield—Bd. Educ., School Dist. 112, general contract brick, concrete school, to Boyd & Son, Fairfield. Est. **$100,000.** Bids 11/20.

Ind., West Lafayette — Purdue University, F. L. Hovde, pres., Smith Hall addn., to Kuhne-Simmons Co., Champaign, Ill., **$654,500.** Construction deferred Womens Residence Halls D and E, and agricultural chemistry bllg. CD 11/5—ENR 11/11, under LB.

Mich., Detroit—City, City Hall, Cannon Memorial Community Center, to Douglas-Cloud, 1017 Penobscot Bldg., Zone 26, **$548,385.** CD 9/8/47—ENR 9/18/47.

●Pa., Allentown—Allentown School Dist., 31 S. Penn St., 2 Junior High Schools, to L. W. Hunsicker Co., 821 Chew St., **$2,964,573.** Bids 11/24. CD 12/9—ENR 12/16, under L. B.

Pa., Norristown—Dpt. Property & Supplies, 18 and Herr St., Harrisburg, general contract Building 8 for male patients at Norristown State Hospital, to Wark & Co., 1700 Sansom St., Phila., Zone 3, **$856,770.** Bids 12/15, awarded 12/27. CD 12/20—ENR 12/23, under LB.

Wash., Bellingham—Western Washington College of Educ., Bellingham, concrete shell of main auditorium, first unit of $1,200,000 Auditorium-Music Bldg., to Tucker & Co., 2012 43 Ave. N. Seattle, **$306,935.** Bids 12/21. CD 12/13.

†Wash., Bremerton—Yards & Docks Annex, Navy Dpt., Arlington, Va., Foundry Bldg. 147 imprvs., Puget Sound Naval Shipyard, NOY 16629, to Hall-Atwater Co., 907 Arctic Bldg., Seattle, **$215,584.** Awarded 12/16.

Wis., Milwaukee — Milwaukee Housing Auth., 844 N. Market St., Zone 2, general contract 99 unit, Housing Proj. 2, Wis. 2-1, to Siesel Constr. Co., 514 E. Ogden St. Zone 2, **$882,381.** Bids 11/16. CD 11/22—ENR 11/25 under LB.

Ont., London—Bd. Educ., C. C. Carrothers, chn., 1 story, rein.-con. brick, stone school, Thompson Rd., Chelsea Green area of London South, to Foundation Co. of Ontario, Ltd., 1320 Bay St., Toronto. Approx. **$619,000** Bids 12/20. CD 12/16.

Que., Valcartier — Canadian Commercial Corp., 70 Lyon St., Ottawa, Ont., J. D. McCarthy, secy., C. A. R. D. E. Plant, to Magloire Cauchon, Ltd., 311 de La Salle St., Quebec City. Approx. **$125,000.**

COMMERCIAL BUILDINGS

BIDS ASKED

After January 1

Pa., Northampton — Northampton Theatre Co., Inc., 234 N. 23 St., Phila., theatre. $250,000. David Supowitz, 246 S. 15 St., Phila., archt. CD 3/24/47—ENR 4/3/47.

About January 10

Pa., New Castle—Euclid Manor Corp., R. D. 9, Pittsburgh, two 2 story, bsmnt., 45x90 ft., brick, steel apartments, 1 story, 12x80 ft. garage, Euclid Ave. $268,000. Phillip Friedman, 121 S. Negley Ave., Pittsburgh, archt.

January 13

Md., Baltimore — Young Mens Christian Assn., 24 W. Franklin St., 4 story, brick Druid Hill Y. M. C. A. Branch addn. Palmer, Fisher, Williams & Nas, 1020 St. Paul St., archts. CD 5/6—ENR 5/27.

N. C., Fayetteville—Highlands Presbyterian Church, Fayetteville, chapel, education and recreation bldg. Thomas & Wagoner, Architects Bldg., Phila., Pa., archts. Basil G. F. Laslett, Fayetteville, superv. archt.

January 14

O., Cleveland—Polyclinic Hospital, 6606 Carnegie Ave., 3 story, bsmnt., brick, steel, concrete hospital addn. $400,000. Dalton-Dalton & Assoc., The Arcade, archts. CD 10/6—ENR 10/21.

●Pa., Lewistown—Lewistown Hospital, Lewistown Hospital alterations, addns. $1,800,000. Extended date. Lawrie & Green, 321 N. Front St., Harrisburg, archts. CD 11/26—ENR 12/9.

January 25

La., Covington—St. Paul College, Covington, 2 story approx. 20,000 sq. ft., brick, tile W-shaped classroom bldg. Plans deposit $25. Wm. R. Burk, Pan American Bldg., New Orleans, engr. CD 10/21—ENR 11/4.

Bids Asked

Ill., Chicago—Algonquin Apartments, c/o Pace Assoc., archts., 53 W. Jackson St., 2 brick, rein.-con. apartments, 50 and Cornell Sts. Over $250,000.

Pa., Harleysville—Charles M. Talley, archt., 314 W. Broad St., Telford; insurance bldg. for Harleysville Automobile Mutual Insurance Co., Harleysville. $250,000. CD 9/10—ENR 9/23.

Pa., Phila.—I. Demchick, archt., 246 S. 15 St., school, for Brith Sholom Congregation, Broad and Courtland Sts. $250,000. CD 8/12—ENR 8/19.

SOON LETS CONTRACT

Ala., Birmingham—Finley Park Apartments, c/o Pembleton & Mims, archts., Title Guarantee Bldg., soon lets contract 77 apartment units. Over $250,000.

Ia., Des Moines—Meredith Publishing Co., 1716 Locust St., soon lets contract 3 story office addn. $600,000. Brooks & Borg, Hubbell Bldg., archts. CD 2/19—ENR 3/4, under Industrial Buildings.

N. Y., New York—New York Telephone Co., 14 West St., Zone 4, soon lets contract telephone bldg. alterations, 140 West St. Voorhees, Walker, Foley & Smith, 101 Park Ave., Zone 17, archts.

N. Y., Tarrytown — Marymount College, Marymound Ave., soon lets contract auditorium. Eggers & Higgins, 542 Fifth Ave., New York 18, N. Y., archts. CD 12/8—ENR 12/16.

Pa., Upper Darby—Upper Darby Jewish Community Center, McClatchy Bldg., soon lets contract community center and synagogue. $250,000. D. Supowitz, 246 S. 15 St., archt. Shonder Berger, 246 S. 15 St., assoc. archt. CD 1/8/47—ENR 1/16/47.

LOW BIDDERS

Ala., Sheffield—Muscle Shoals Community Hotel Co., Inc., c/o low bidder, Dec. 21, hotel, from Brice Bldg. Co., 1021 2 Ave. N., Birmingham, **$382,945.** CD 12/10—ENR 12/16.

Fla., Miami—Beth David Synagogue, c/o low bidder, Dec. 22, synagogue, from Star Constr. Co., 1636 Dupont Bldg., **$790,000.** CD 12/2—ENR 12/9.

Pa., East Stroudsburg — General Hospital, East Stroudsburg, Dec. 15, hospital addns., alterations, from A. L. Rake & Son, 223 Washington St., **$607,150.** CD 12/1—ENR 12/9.

Tex., Port Arthur—J. Weingarten, Inc., 808 Prairie St., Houston, cancelled bids to have been opened Dec. 30, store. **$250,000.** CD 12/21—ENR 12/23.

CONTRACTS AWARDED

Calif., Los Angeles—Panorama Community Homes, 5555 W. Manchester Blvd., 174 frame, stucco dwellings, Stansberry, Costello and Murietta Aves., etc., Van Nuys Dist., to Kaiser Community Homes, 5555 W. Manchester Blvd., Est. **$833,750.**

Calif., Martinez—Roman Catholic Archbishop of San Francisco, 1100 Franklin St., 2 story, bsmnt., rein.-con. St. Catherine's School, to B. & R. Constr. Co., 110 Market St., San Francisco, Scott Co., 243 Minna St., San Francisco, and Coast Heating & Air Conditioning, 2001 Peralta St., Oakland, **$257,036.** Bids 12/22. CD 12/13—ENR 12/16.

Conn., Stamford—Second Fairlawn Corp., 1068 Main St., 2 story, brick veneer, frame, garden apartments, 52 garages for 132 families, Main St. Owner builds. **$700,000.** Everett C. Bradley, 85 Whitney Ave., New Haven, archt.

Del., New Castle—Gordy & Son, Penna. and Roosevelt Aves., residential development, Llangalen Estates, separate contracts, **$250,000.**

Fla., Pensacola—Norwood Homes, Inc., c/o contractor, 40 homes, to Realty Constr. Co., 207 18 St. S., Birmingham, Ala. Est. **$300,000.**

Ga., Decatur — St. Thomas More R. C. Church, 119 Fairview Ave., church school bldg. and convent, separate contracts. **$250,000.** Henry D. Dagit & Sons, 1329 Race St., Phila., Pa., archts. CD 12/1/47—ENR 12/11/47.

Ga., Thomson—Hickory Hill Development Co., c/o Harold Teasley, Thomson, 100 homes, separate contracts. Over **$300,000.**

Ill., Chicago—Hillmans Pure Food Stores, 28 W. Washington St., masonry and carpentry work for 2 story, brick, concrete, steel store, to Paul Schwendener, 7553 S. Chicago Ave. Est. **$250,000.** Leichenko & Esser, 225 N. Michigan St., archts.

Minn., St. Paul—A. S. Fine, 510 1 Ave. N., Minneapolis, general contract 1 story, bsmnt., 95 x 125 ft. store, Ford Parkway and Cleveland Ave., to I. Goldetsky, 1195 Lincoln Ave. Approx. **$250,000.** P. E. Crosier & Son, 2441 Lyndale Ave. S., Minneapolis, archts.

●N. J., Clifton—Joseph P. Brunetti, 100 Essex St., Maywood, 2,000 family garden apartment proj. on 108 acre site, Allwood Rd. east of Broad St. Owner builds. **$14,500,000.** Leonard G. Feinen, 320 Lincoln Ave., Hasbrouck Heights, archt.

N. J., Longport—Mayers Constr. Co., c/o R. B. Williams, archt., 8409 Ventnor Ave., Margate, residential development, various locations, separate contracts. **$250,000.**

N. J., Woodbury — Louis Bleznek, 814 N. Broad St., residential development, Logan St., separate contracts. **$250,000.**

Okla., Enid—First Baptist Church, Enid, educational bldg. for First Baptist Church, to D. C. Bass & Sons Co., Bass Bldg., Enid, **$272,963.** Awarded 12/20. Noftsger & Lawrence, 2829½ N. W. 23 St., archts.

Okla., Tahlequah—Methodist Home, Tahlequah, residences and dining halls for Methodist Old Folks Home, to Manhattan Constr. Co., Manhattan Bldg., Muskogee. Est. **$265,000.** Awarded 12/20. Harelson & Horstman, Muskogee, archts.

Pa., Abington—Owner, c/o general contractor, residential development, Acorn Lane and Sylvania Ave., to Charles Helms, 501 Pleasant Pl., Phila., over **$250,000.**

Pa., Doylestown—Key Theatres Corp., Cross Keys, Rt. 611, theatre, to Edward M. Happ & Son, Ashland and Washington Sts. **$250,000.** R. H. Maier, Jr., Honey Brook, Pa., archt.

Pa., Lancaster—F. W. Woolworth Co., 123 S. Broad St., Phila., department store, separate contracts. **$400,000.** H. W. Hokes, c/o owner, engr.

Pa., Oreland — Sunnybrook Inc., Glenside, residential development, Willas, Clive and Burton Rds., separate contracts. **$250,000.** Berninger, Haag & D' Entremont, 304 York Rd., Jenkintown, archts.

Pa., Phila. — Congregation Brith Israel, Roosevelt Blvd. and D St., synagogue and school addns., separate contracts. **$250,000.** CD 5/26—ENR 6/3.

Pa., Phila. — Fidelity Philadelphia Trust Bldg., 123 S. Broad St., Phila., altering office bldg., air-conditioning to Day & Zimmermann, Inc., Packard Bldg. Over **$250,000.** CD 11/17—ENR 12/16.

Pa., Phila.—Keefer Homes, Inc., 100 W. Rockland St., residential development, Kindred St., separate contracts. Approx. **$350,000.**

Pa., Phila.—Mount Airy Park Corp., 5644 Rohrer St., residential development, Yerkes St., separate contracts. Approx. **$250,000.** G. H. Murphy, 1621 Sellers St., archt.

●Pa., Phila.—Russeks Fifth Avenue, Inc., 5 Ave. and 36 St., New York, N. Y., modernizing store, to Frank J. Larkin Constr. Co., Inc., 1518 Parrish St., **$1,000,000.** Thalheimer & Weitz, Bankers Security Bldg., archts.

Pa., Phila.—Philip Shapiro, Market St. Natl. Bank Bldg., apartment, 1600 W. Allegheny Ave., separate contracts. **$250,000.** Edwards & Green, Broadway and Carman Sts., Camden, N. J., archts.

Pa., Phila.—Stenton Hills, Inc., 6401 N. 12 St., residential development, Sharpnack St., separate contracts. **$250,000.**

Pa., Phila.—Woodbine Corp., 1200 Unruh St., residential development, Oakland St., separate contracts. **$250,000.** Christian H. Fries, 3701 N. Broad St., archt.

Pa., Pottstown—Warren B. Zern, Franklin Apts., residential development, Washington St., separate contracts. Approx. **$250,000.**

Pa., Roslyn—Michael Lubin, Real Estate Trust Bldg., Phila., residential development, High Ave., separate contracts. **$250,000.** Reliance Homes, Inc., Lester, archt.

●Pa., Roslyn—Sunnybrook Inc., Glenside, residential development, various locations, separate contracts. **$2,500,000.**

Pa., Ridley Park—Ridley Farms, Inc., 20 S. 15 St., Phila., 37 residences, Grand Ave. and West Ridley Circle, to Louis J. Rosato, 201 W. Broadway Ave., Clifton Heights, **$296,000.** H. Barrett Pennell, 33 E. Wynnewood Rd., Wynnewood, archt.

Pa., Springfield — Netherwood Corp., 7060 Garrett Rd., Upper Darby, residential development, separate contracts. **$280,000.** David Slott, 70-60 Garrett Rd., Upper Darby, archt.

Pa., Springfield—Robert H. Whitehall, Inc., 43 S. Lansdowne Ave., Lansdowne residential development, Brock Rd., etc., separate con-

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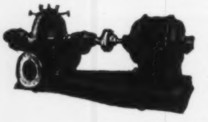

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tracts. **$250,000.** K. Otto, 1528 Buckingham Dr., Rosemont, archt.

Pa., Upper Darby—Bradley B. Robinson, 167 Powell Lane, Upper Darby, residential development, separate contracts. **$250,000.**

Pa., Upper Moreland Twp. (Warminster P. O.)—Joyce Industries, 123 S. Broad St., Phila., residential development, Warminster and County Line Rds., separate contracts. **$250,000.** Heacock & Platt, 152 N. 15 St., Phila., archts.

Pa., Wynnewood—Maguire Constr. Co., 111 Simpson Rd., Ardmore, residential development, separate contracts. **$250,000.**

Tenn., Memphis—Catholic Diocese, c/o contractor, high school, to Seth Glem & Assoc., 166 Monroe Ave. Est. **$500,000.** CD 7/27—ENR 8/2/45.

Tex., Galena Park—Fred D. Leggett & Abe Zuber, 116 North St., 40 frame dwellings, own forces. Approx. **$280,000.** CD 12/27.

Tex., Galveston—St. Marys Catholic Orphanage, 41 and 42 and Q and R Sts., orphanage, to Texas Gulf Constr. Co., 2215½ Mechanic St., Approx. **$500,000.** CD 12/23—ENR 12/30, under LB.

Tex., Houston—Hall's Bayou Development Co., c/o Bud Holtz, Scanlan Bldg., 50 dwellings at Tautenhahn and Langley Rds., own forces. **$275,000.** CD 12/27.

Tex., Houston—L. H. Jolly, c/o Pine Shadows, Houston, housing, Pine Shadows area. Owner builds. Approx. **$300,000.** CD 12/27.

Tex., Houston—Charles Northrupp Peck, Shell Bldg., 70 dwellings. Owner builds. **$535,000.** CD 12/23—ENR 12/30.

Tex., Houston—Tom D. Ruland & Assoc., Spring Branch, 80,000 sq. ft. shopping center, own forces. **$850,000.** CD 12/23—ENR 12/30.

Tex., Houston—R. C. West & Assoc., Citizens State Bank Bldg., housing in portion of Pine Shadows sub-division, force account. **$275,000.** CD 12/27.

Wash., Olympia—Tom O'Leary, Olympia, theater, day labor. **$257,600.** CD 2/13/46—ENR 2/28/46.

Wash., Seattle—C. D. Stimson Co., White Bldg., Zone 1, 2 story, bsmnt. store, E. 45 St. and University Way, to Fritz Anderson, Bothell. Est. **$250,000.** Martin & Eckmann lessee. CD 12/1—ENR 12/16.

Wash., Seattle—Suburban Co., c/o John Graham, Jr., archt., Dexter Horton Bldg., Zone 4, general contract (1st unit) Bon Marche Department Store in Northgate shopping center, to Howard & Wright & Co., 407 Yale Ave. N., **$868,860.** Bids 9/21. CD 10/1—ENR 10/7, under LB.

Wis., Milwaukee—Ed. Schuster & Co., 2153 N. 3 St., Zone 12, 5 story, bsmnt., 109x126 ft. brick, steel, stone 3rd St. Department Store addn., rein.-con. fdn. to Selzer-Ornst Co., 6222 W. State St., Zone 8. Est. **$850,000.** CD 8/11—ENR 8/26.

Wis., Whitefish Bay (P. O. Milwaukee)—St. Monica Catholic Congregation, 5635 N. Santa Monica Blvd., 2 story, 75x239 ft., steel, brick, convent and school bldg., concrete fdn., to Ed. Steigerwald & Son, 5310 W. State St., Zone 8. Est. **$475,000.** Bids 11/30. CD 11/9—ENR 11/18.

Que., Hampstead (Postal Dist. Montreal)—J. C. Williscroft, 409 Mount Royal Ave., concrete, steel, brick apartment. Owner builds. **$250,000.**

Que., Montreal—Camusa Realty Ltd., 1434 St. Catherine St. E., 32 suite apartment, to J. P. Cartier, 2 Bellechasse St. Est. over **$250,000.** H. E. Greenspoon, 1434 St. Catherine St. E., archt.

INDUSTRIAL BUILDINGS

BIDS ASKED

January 11

Minn., Minneapolis—SALES and SERVICE—Warren-Cadillac, Inc., 9 W. 14 St., 1 story, 125 x 275 ft. superstructure auto sales and service garage, 700 Wayzata Blvd. $270,000. Ellerbe & Co., E. 505 1 National Bank Bldg., St. Paul, archts. CD 10/28—ENR 11/4.

January 17

O., Ashtabula—TRESTLE and MIX HOUSE—Electroc Metallurgical Co., 137 47 St., Niagara Falls, N. Y., Trestle and Mix House Bldg. 36 and Bridge and Head House Bldg. 37. Approx. $250,000. Wm. McDowell, c/o owner, ch. engr.

Bids Asked

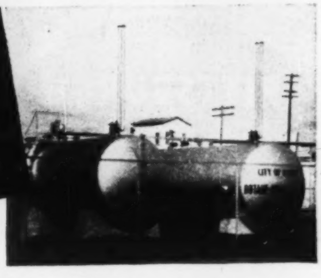
Del., Wilmington — WAREHOUSE — Delaware Floor Products Inc., Christiana Ave., warehouse. $70,000.

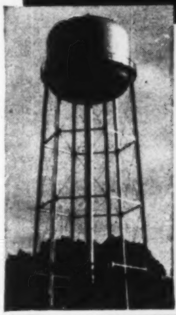
Pa., Phila. — INDUSTRIAL — S. Burczynski, archt., 1321 Arch St., industrial bldg., for Superior Spring & Axle Works, 1631 Huntington Park Ave. Approx. $68,000. CD 8/11—ENR 8/19.

Pa., Phila. — BAKERY, etc. — Owner, c/o Lewis J. Cowan, archt., 1505 Pine St. (selected list bidders) bakery and garage, $200,000. Mrs. Smith's Pie Co., 963 N. 9 St., lessee.

R. I., Pawtucket—MACHINE SHOP—Blackstone Valley Gas & Electric Co., High St., (selected list bidders) 2 story, 50x50 ft., brick, steel machine shop, High St. Monahan & Meikle & Johnson, 255 High St., archts.

Wis., Milwaukee — STORAGE CELLAR — Schlitz Brewing Co., 235 W. Galena St., 10 story, 108x219 ft., mason and concrete storage cellar bldg. Oscar Jannsen, 721 Olive St., St. Louis, Mo., archt.





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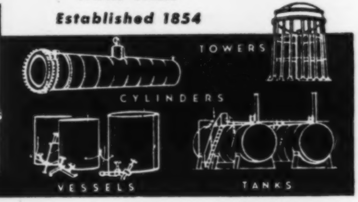

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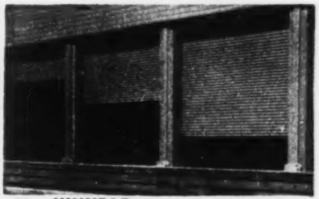

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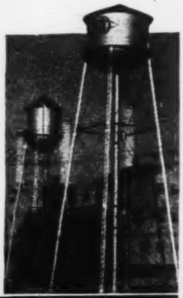

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Calif., San Francisco — PLANT — Pacific Gas & Electric Co., 245 Market St., soon lets contract tar dehydration plant at Potrero Gas Plant. Over $70,000. CD 12/20—ENR 12/30.

Md., Baltimore — WAREHOUSE — B. V. D. Corp., 527 W. Pratt St., soon lets contract 2 story, brick warehouse, Wash Blvd. and Parkman St., $75,000. J. E. Moxley, 1722 Ellamont St., archt.

●**Minn., Twin Lakes**—GENERATING PLANT—Dairyland Power Co-operative, 407 Rivoli Bldg., La Crosse, Wis., soon lets contract diesel engine elev. generating plant, main power bldg. to house two 2700 kw. generators, etc. $1,000,000. Ellerbe & Co., E 505 First National Bank Bldg., St. Paul, engrs. CD 8/12—ENR 8/26.

S. C., Rock Hill — NEWSPAPER — J. N. Pease & Co., archts., 119½ E. 5 St., Charlotte, soon lets contract newspaper bldg. for Herald Publishing Co., Rock Hill.

LOW BIDDERS

Ga., Columbus — PLANT — The Ledger-Enquirer, W. 12 St., rejected bids Nov. 9, printing plant addns. LB. **$139,670.** CD 11/15—ENR 11/18, under LB.

La., Haynesville — PLANT — Haynesville Electric Refrigeration Co-operative, Haynesville, rejected bids Nov. 25, food processing and locker plant. CD 10/25—ENR 10/28.

Minn., Wadena—WAREHOUSE, etc.—Todd-Wadena Electric Co-operative, Wadena, Dec. 20, general contract, 1 story, warehouse, garage, office, from H. L. Stavn Co., Hibbing, **$129,000.** CD 12/2—ENR 12/9.

N. C., Charlotte — INDUSTRIAL — General Electric Co., Commercial Bank Bldg., rejected bids Dec. 6, industrial bldg. CD 11/23—ENR 12/2.

CONTRACTS AWARDED

Conn., Hartford — STORAGE VAULT — 20 Allyn St., Inc., 49 Pearl St., 2 story, brick, steel, concrete fur storage vault, Allyn St., to Southern New England Contg. Co., 500 Blue Hills Ave. Est. **$125,000.** Ebbets, Frid, & Prentice, 862 Asylum St., archts.

Conn., Plainville — WAREHOUSE — Igoe Brothers, Inc., 73 Metropolitan Ave., Brooklyn, N. Y., 1 story, 80x300 ft., brick, concrete warehouse Sparks and Lewis Sts., to Walter Kidde Contractors, Inc., 140 Cedar St., New York, N. Y. Est. **$135,000.** CD 12/23.

Conn., Torrington—SALES and SERVICE—K. D. Sheldon Motor Co., 286 Main St., 1 story, 100 x 150 ft., brick, concrete, steel auto sales and service, E. Main St., to Torrington Bldg. Co., 187 Church St. Est. **$70,000.** Raymond L. Brown Jr., 60 Main St., archt.

Del., Georgetown — WAREHOUSE — J. C. Townsend, Jr. & Co., Georgetown, 1 story, 100 x 130 cinder block warehouse, to William B. Dorey, Harbeson, Millsboro P. O., **$70,000.**

Del., Milford—STORAGE—Victor Lynn Lines, Milford, 1 story, concrete block truck storage bldg., to John A. Vickers, Seaford, **$70,000.**

Del., Smyrna — ASSEMBLY SHOP — Willson Cabinet Co., Smyrna, 1 story masonry assembly shop, to Willis & Joseph, Inc., Ehrlich Bldg., Dover, **$75,000.** CD 8/2—ENR 8/12.

Fla., Miami—SERVICE, etc.—Sunshine State Investment Co., c/o contractor, service bldg. and store, to Tom W. Jones Co. 2976 S. W. 24 Terrace, **$104,750.** CD 12/2—ENR 12/9.

Ill., Chicago — WAREHOUSE — General Motors Corp., 840 N. Michigan St., design and construction 1 story, brick, steel, warehouse, to J. Emil Anderson & Son, 1811 W. Balmoral St., **$160,000.**

Ill., Chicago—FACTORY—C. Handelman, 767 Milwaukee Ave., masonry, contract, 1 story, 120x250 ft., brick, steel factory, to L. Balkin Builders, 3610 S. Albany Ave. A. R. Hauser, 201 N. Wells St., archt.

Ill., Chicago — PLANT, etc. — B. A. Railton Co., 363 W. Erie St., 1 story, brick, processing plant, garage and offices, to Sumner S. Sollitt Co., 307 N. Michigan Ave., Est. **$350,000.**

Ia., Waterloo—WAREHOUSE—Sawyer Biscuit Co., 6 and Mulberry Sts., warehouse, to John G. Miller Constr. Co., 222 W. Mullan St., **$75,000.** C. E. Westcott Eng. Co., 205 W. Wacker Dr., Chicago, Ill., engr.

Md., Baltimore — WAREHOUSE — De Boy Smith Constr. Co., 232 N. Franklintown Rd., 1 story, 14x121x247 ft., masonry warehouse, 401-25 N. Warwick Ave. Owner builds, **$90,000.**

Minn., Halstad—GARAGE, etc.—Red River Valley Co-operative Power Assn., Halstad, general contract, REA garage, office, warehouse bldg., to Larson Constr. Co., Pelican Rapids, **$118,200.** Bids 11/15. CD 10/27—ENR 11/4.

N. C., Hickory—BOTTLING PLANT—Coca Cola Bottling Co., Hickory, bottling plant, to Elliott Building Co., Hickory, **$118,000.** Bids 12/14. CD 12/14—ENR 12/16.

O., Columbus — GARAGE — Omar, Inc., 1910 Harney St., Omaha Neb., truck garage, 609 Oakland Park Ave. Owner builds. CD 12/4/47—ENR 1/8/48.

Pa., Marcus Hook — ROTARY COOLER PLANT—General Chemical Co., 1100 Line St., Camden, N. J., rotary cooler plant and sulphate plant alterations to J. A. Bader & Co., Inc., 923 Market St., Wilmington, Del., **$70,000** each. E. M. Richardson, c/o owner, engr. CD 10/13—ENR 10/21.

Pa., Phila.—FACTORY—American Preserve Co., 3 St. and Lehigh Ave., factory addns., alterations, separate contracts. **$75,000.**

Pa., Phila. — POWER PLANT — American Telephone & Telegraph Co., Bourse Bldg., power plant, to Robert E. Lamb & Son, Inc., 3429 W. Indiana Ave., over **$68,000.** E. A. Russell, c/o owner, engr. CD 11/24—ENR 12/2.

Pa., Phila. — STORAGE — M. Dashensky & Sons, 4962 Boynton St., 1 story, 126x41 and 14x72 ft., brick storage, to Edmond A. Bateman, 34 E Chestnut Hill Ave., Phila., over **$68,000.**

Pa., Phila. — FACTORY — Wissahickon Asbestos Co., Ambler 1 story, concrete block, frame factory addn. separate contracts. Approx. **$70,000.**

Pa., Phila.—INDUSTRIAL—Fred Witaker Co., Scotts Lane east of Ridge Ave., 2 story, 79x104 ft. brick industrial mfg. bldg., separate contracts. Approx. **$75,000.**

R. I., Providence — WAREHOUSE — Peter Montaquilla, c/o D. Thomas Russillo, archt., 433 Westminster St., 1 story, part bsmnt., 45x260 ft., brick, cinder block warehouse, Rathbone St., to Cianci Constr. Co., 118 Cottage St., North Providence. Est. **$75,000.**

Tex., Dallas — FACTORY — Huey & Philps, 1102 Pacific St., 1 story, 106x200 ft. monitor type, concrete, steel factory, steel fdn. and 72x100 ft. L shaped warehouse addn. and 3rd story 199x196 ft. addn. to existing 2 story warehouse, to Meers Constr. Co., Gr. Natl. Life Bldg., **$156,000** and Approx. **$200,000** respectively. CD 7/13—ENR 7/15, under LB.

Wis., Lake Geneva — SHOP, etc. — Wisconsin Southern Gas Co., Lake Geneva, 2 story, 110x167 ft., steel, concrete block, brick shop and office, concrete fdn., to Consolidated Service Co., Lake Geneva, Est. **$150,000**. E. B. Mathewson Co., 27 S. LaSalle St., Chicago, Ill., engr.

Wis., Port Washington — FACTORY — Harnischfeger Corp., Port Washington, 1 story, 60x140 ft., steel, concrete block, wood trusses factory addn., concrete fdn., to Thomas E. Gahan, 627 N. Montgomery St. W. E. Browne, 720 N. Jefferson St., Milwaukee, Zone 2, engr.

Wis., Stephensville (P. O. Hortonville) — FOUNDRY — American Tool & Fdry Co., Stephensville, 3 story, 20x120 ft., steel, concrete block foundry addn., concrete fdn., to Fredricks Constr. Co., New London. R. M. Connelly, 126 W. Washington St., Appleton, engr.

Ont., Timmons — DRY HOUSES — Hollinger Consolidated Gold Mines, Ltd., 602 Royal Bank Bldg., dry houses and office, own forces. **$200,000.**

P.E.I., Charlottetown — FACTORY—Lavatto Potatoe Co., Rockville, Conn., U. S. A., to County Constr. Co., 97 Water St. Est. **$70,000.**

Que., Montreal — STABLES — National Breweries, Ltd., 990 Notre Dame W., 1 story, 50x200 ft. steel, wood stables, Cote de Liesse Rd., to L. Deveault, 140 Quimet St., St. Laurent. Est. **$75,000.** CD 3/18—ENR 3/25.

Que., Montreal—FACTORY—Park Holdings, Ltd., 7080 Hutchison St., addnl. story to factory, to Louis Donolo, Inc., 85 Jean Talon St. W. Approx. **$100,000.** Mayerovitch & Bernstei[illegible] 1178 Phillips Pl., archts., I. S. Backler, 1250 McGill College Ave., engr.

UNCLASSIFIED

BIDS ASKED

January 11

Georgia—RURAL DISTRIBUTION LINES—Pataula Electric Membership Corp., Cuthbert, 162.77 mi. rural distr. lines in Calhoun, Clay, Quitman and Randolph Counties. J. B. McCrary Eng. Co., 22 Marietta St., Atlanta, engr. CD 8/23—ENR 8/26.

January 14

Calif., Berkeley — STADIUM — Regents University of California, Berkeley, seating on west side of California Memorial Stadium, over $50,000. Plans deposit $25.

January 18

♦**Canal Zone, Coco Solo** — WATERFRONT STRUCTURES—Pub. Wks. Office, 15th Naval Dist., Headquarters, Balboa, Canal Zone, providing and securing repairs to waterfront structures at Naval Station, Spec. 21449. Plans deposit $10.

January 25

Minn., Maple Lake — GENERATOR — Rural Co-operative Power Assn., O. N. Gravgaard pres., steam generator, auxiliaries, etc., for power house, $50,000. Plans deposit $25. R. D. Thomas & Assoc., 400 Metropolitan Life Bldg., Minneapolis, engrs. CD 3/27/47—ENR 4/17/47.

January 27

♦**N. Y., Farmingdale**—CEMETERY—U. S. Eng., 120 Wall St., New York, buildings, utilities addns., alterations, to Long Island National Cemetery, Pinelawn.

N. Y., St. George—TERMINAL—Comr. Marine & Aviation, Pier A, North River, foot of Battery Pl., New York, Zone 4, terminal

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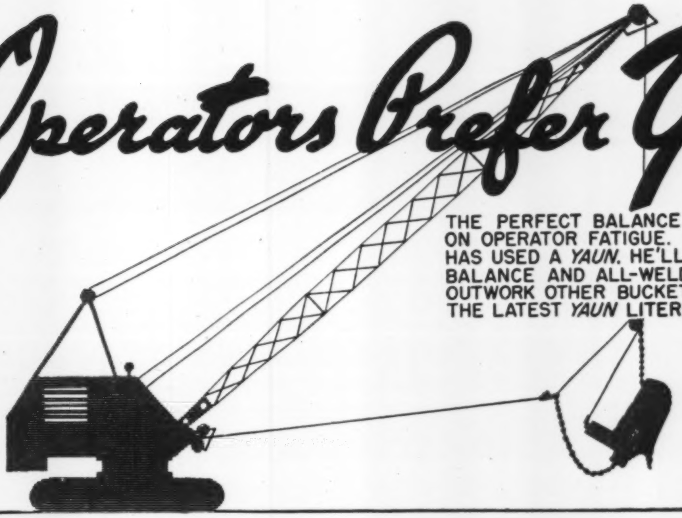

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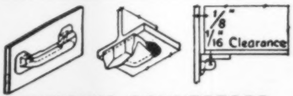

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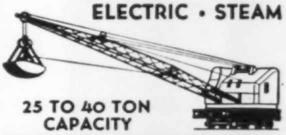

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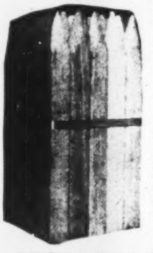

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Use fast-working electrical tools on any construction or maintenance job with this high capacity, portable, compact electric plant. Equipped with four-receptacle box for direct plug-in of tools or lights. Available with carrying frame, or dolly-mounted. Powered by Onan 10 HP, two-cylinder, 4-cycle, air-cooled engine. Shipped complete . . . ready to go!

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ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 HP. BH: 2-cylinder opposed, 5½ HP. IB: 1-cylinder, 3¼ HP.

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ENGINEERS & CONTRACTORS
155 East 44th Street New York 17, N. Y.

bldgs.; reconstructing terminal and approacnes at St. George Ferry Terminal. Contr. 2594R. Plans deposit $35. CD 5/21/45—ENR 5/31/45.

February 1

†Washington—TRANSMISSION LINES—Bureau Reclamation, Dpt. Interior, Yakima, 34.5 kilovolt and 13.8 kilovolt transmission lines and 2.4 kilovolt distr. line for Roza Div. Pumping Plants, Roza Div., Yakima Proj., Yakima and Benton Counties, Spec. 2510.

February 15

†Idaho — POWER CIRCUIT BREAKERS — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Burley and Rupert, 4 outdoor, power circuit breakers for switchyard at Minidoka Power Plant, Minidoka Proj., Spec. 2519. Plans deposit $1.

†Nebraska — RAILROAD RELOCATION — U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., relocating Chicago, Burlington & Quincy R.R., Oxford Branch in Harlan and Franklin Counties, incl. clearing, grubbing, earthwork, bridges and other drainage structures, laying track and ballasting, crossings, right-of-way fence, markers and signs, etc. Eng-23-028-49-136.

LOW BIDDERS

†Arizona-California — CEMENT — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., Dec. 21, approx. 37,500 bbl. bulk portland cement for Coachella Valley Distr. Sys., Unit 1, All American Canal Sys., Spec. 2493, from Permanente Cement Co., 1924 Broadway, Oakland, Calif. Est. **$120,625.** CD 12/9.

Ga., Albany—MOTOR COURT—J. T. & W. B. Haley, Albany, rejected bids Nov. 3, motor court. LB **$148,383.** Project postponed. CD 11/8—ENR 11/11, under LB.

Ga., Atlanta—SWIMMING POOL, etc.—Variety Club, Dec. 21, c/o low bidder, swimming pool and locker rooms, from Ivey Bros. Constr. Co., 3111 Peachtree Rd. **$67,782.** CD 12/14.

N. C., Chapel Hill—STADIUM—University of North Carolina, Chapel Hill, Dec. 14, press and guest box at Kenan Stadium, from Wm. Muirhead Constr. Co., Durham, **$158,000.** H. Raymond Weeks, Inc., 504 Snow Bldg., Durham, archt.

Pa., Phila.—ZOOLOGICAL GARDENS—Fairmount Park Comn., City Hall, Dec. 15, Carnivora House, Zoological Gardens from Henry E. Baton, Inc., 1717 Sansom St., Phila. **$849,000.** CD 11/24—ENR 12/2.

CONTRACTS AWARDED

Alabama—RURAL DISTRIBUTION LINE—Pioneer Electric Co-operative, Greenville, 300 mi. rural distr. line and other sys. imprvs., Butler Co., etc., force account, **$675,000.** Mowbray Eng. Co., Greenville, engr. CD 12/13—ENR 12/30.

Conn., Hartford—TUNNEL—Hartford Hospital, 80 Seymour St., rein.-con. tunnel, Seymour St., to Industrial Constr. Co., 721 Main St., **$70,000.** Ebbets Frid & Prentice, 862 Asylum St., archts.

Miss., Jackson — SWIMMING POOL — City, swimming pool and bathhouse in Battlefield Park, to Flint Bros. Constr. Co., Deposit Guaranty Bank Bldg., **$133,800.** Bids 12/20. CD 12/8.

Missouri — RURAL DISTRIBUTION LINES —Northeast Missouri Electric Power Co-operative, Palmyra, labor only, 80 mi. 69 kv transmission line, Marion Co., to Triple H Constr. Co., P. O. Box 50, Linton, Ind., **$57,538;** labor only 80 mi. kv. transmission line, Marion Co., to Southern Line Constr. Co., 62 Auction Ave., Memphis, Tenn., **$190,000.** CD 12/13—ENR 12/23.

Okla., Cushing — SWIMMING POOL — City, City Hall, municipal swimming pool, to Stigler Constr. Co., Stigler, **$127,620.** Est. $130,000. Bids 12/7, awarded 12/22. CD 11/16—ENR 11/25.

Wash., Sunnyside—SWIMMING POOL—City, City Hall, 50 x 120 ft. swimming pool and 24 x 80 ft. bathhouse, to J. N. Payne, Omak, **$67,530.** Est. $51,000. Bids 12/22. CD 12/8.

B. C., Comox — WHARF — Dpt. P. Wks. Hunter Bldg., Ottawa, Ont., wharf replacement, to Fraser Pile Driving Co. Ltd., Box 219, New Westminster, Approx. **$122,653.** CD 11/29—ENR 12/9.

B. C., Vancouver—ICE ARENA—Point Grey Community Center Society, 1930 Marine Bldg., 166x273 ft., concrete, steel ice arena, to Bennett & White Constr. Co., Ltd., 660 Howe St., Approx. **$400,000.** Awarded 12/21. McCarter & Nairne, 1930 Marine Bldg., archts.

Que., Chandler — WHARF — Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf exten., to Foundation Co. of Canada, Ltd., 1900 Sherbrooke St. W., Montreal, Approx. **$459,624.** CD 12/7—ENR 12/16.

Proposal Advertisements see pp. 131, 132 & 151. Proposed Projects see p. 104

Bids: January 26, 1949 (792)

Reservoir and Appurtenances

Office of City Purchasing Agent
Nashville, Tennessee

Sealed bids will be received by the Purchasing Agent of the City of Nashville, Tennessee, at the office of the Purchasing Agent, until 10:00 A.M. Central Standard Time, January 26th, 1949, for the West Nashville Concrete Reservoir and Appurtenances, according to plans and specifications which are on file in the office of the Director of the Nashville Waterworks Department, Room 201 City Hall, Nashville, Tennessee, and also the office of The Chester Engineers, 210 East Park Way, Pittsburgh 12, Pa. Immediately after closing time for the receipt of bids they will be publicly opened and read aloud in the office of the Purchasing Agent, City Hall.

The successful bidder will be required to furnish a satisfactory performance bond.

All bids shall be made upon the blank forms of the contract documents. Copies of all contract documents, including Proposal Form, Contract Plans and Specifications and Instructions to Bidders may be obtained at the office of The Chester Engineers by depositing Twenty-five Dollars ($25.00) for each set of documents so obtained . The entire deposit will be refunded to each actual bidder and Fifteen Dollars ($15.00) will be returned to all others who return plans and specifications in good condition within ten (10) days after opening of bids.

The right is reserved by the City of Nashville, through its Mayor, to reject any and all bids, to waive any informalities in the bids received, and to accept any bid, which in its opinion, may be for the best interest of the City.

A certified check or bank draft, payable to the City of Nashville, or a satisfactory bid bond executed by the bidder and a surety company authorized to transact business in the State of Tennessee, in an amount equal to Five Percent (5%) of the bid, shall be submitted with each bid.

No bid may be withdrawn after the scheduled time for the receipt of bids.

CITY OF NASHVILLE, TENNESSEE
E. B. Smith,
Purchasing Agent.
A-1.

Bids: January 24, 1949 (797)

New Roadway Lighting System

THE DELAWARE RIVER JOINT COMMISSION

Sealed bids will be received for New Roadway Lighting System, to be identified as Contract No. 2A, at the office of the Secretary of The Delaware River Joint Commission, Administration Building, Bridge Plaza, Camden, New Jersey, until 1:30 P. M., Eastern Standard Time, Monday, January 24, 1949 and then and there will be publicly opened and read.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this contract, which may be obtained upon a deposit of $10.00 which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified or cashier's check in the sum of $20,000.00 payable to The Delaware River Joint Commission and drawn upon a national or state bank or trust company having an office either in Philadelphia, Pennsylvania or Camden, New Jersey and the Surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Commission will afford prospective bidders an opportunity to inspect the work to be done.

The right is reserved to reject any or all bids.

THE DELAWARE RIVER JOINT
COMMISSION
JOSEPH K. COSTELLO
SECRETARY

Bids: January 21, 1948 (799)

Removal of Portion of Bridge

NOTICE

Sealed proposals endorsed "Removal of Portion of Bridge No. 177, Newark and New York Branch, over Hackensack River between Kearny and Jersey City, N. J.," will be received in the office of the Chief Engineer of The Central Railroad Company of New Jersey, Jersey City Terminal, Jersey City 2, N. J., on or before 1:00 P. M., Eastern Standard Time, on Friday, January 21, 1949, consisting of the removal and disposal of the structural steel and machinery in swing draw span and one double track approach span, masonry and piles in 4 piers, the fender system, and cleaning of channels and dredging.

Plans, specifications and proposals may be obtained at the office of the Chief Engineer on the payment of fifteen dollars ($15.00) by cash or certified check, payable to The Central Railroad Company of New Jersey, Walter P. Gardner, Trustee, for each set of plans and specifications, which will not be refunded.

The Railroad Company reserves the right to reject any or all bids.

THE CENTRAL RAILROAD
OF NEW JERSEY

Bids: January 24, 1949 (798)

Widening Bridge Roadway

THE DELAWARE RIVER JOINT COMMISSION

Sealed bids will be received for Widening the Bridge Roadway between Bent 14 near Fourth Street, Philadelphia, and Bent 29 near Fourth Street, Camden on the Bridge connecting the cities of Philadelphia, Pennsylvania and Camden, New Jersey, to be identified as Contract No. 4, at the office of the Secretary of The Delaware River Joint Commission, Administration Building, Bridge Plaza, Camden, New Jersey, until 1:30 P. M. Eastern Standard Time, Monday, January 24, 1949 and then and there will be publicly opened and read.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this contract, which may be obtained upon a deposit of $10.00 which will be remitted upon receipt of bid or the return in good condition of the copies so taken within thirty days after the opening of bids.

Each proposal must be accompanied by a certified or cashier's check in the sum of $100,000.00 payable to The Delaware River Joint Commission and drawn upon a national or state bank or trust company having an office either in Philadelphia, Pennsylvania or Camden, New Jersey and the Surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialmen's Bond in the sum of 100 percent.

The Commission will afford prospective bidders an opportunity to inspect the work to be done.

The right is reserved to reject any or all bids.

THE DELAWARE RIVER JOINT
COMMISSION
JOSEPH K. COSTELLO
SECRETARY

Bids: January 17, 1949 (804)

Grading, Drainage and Structures of Turnpike

PENNSYLVANIA TURNPIKE COMMISSION
Harrisburg, Pennsylvania
NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 11 North Fourth Street, Harrisburg, Pennsylvania, until 2:00 P.M. (Eastern Standard Time), *the 17th day of January, 1949*, and immediately thereafter will be taken to the Public Utility Commission's Hearing Room No. 1, North Office Bldg., Harrisburg, Pennsylvania, and immediately publicly opened and read aloud, for the following contract:

For construction of grading, drainage and structures of Turnpike *Section 24C*, part of the Philadelphia Extension, *in Elizabeth and Clay Township, Lancaster County*, Commonwealth of Pennsylvania. This section being situated as follows:

Beginning at a point approximately 1300 feet west of U. S. Route 322, at Station 439+50, Elizabeth Township, Lancaster County, thence in an Easterly direction, to a point approximately 150 feet west of L.R. 36128, at Station 646+50, Clay Township, Lancaster County a distance of 3.90 miles.

Approximate quantities of the principal items are as follows:

Class I Excavation, 541,000 Cubic Yards; Class II Excavation, 20,000 Cubic Yards; Class A Concrete, 2,800 Cubic Yards; Class B Concrete, 4,000 Cubic Yards; Plain Steel Bars, 767,000 Lbs.; Fabricated Structural Steel, 407,000 Lbs.

Copies of plans, specifications and other contract documents, including cross-sections, are on file and open to public inspection at the offices of the Pennsylvania Turnpike Commission located at Harrisburg, Pennsylvania, on January 3, 1949. Copies of cross-sections may be purchased from the Pennsylvania Turnpike Commission for the sum of Fifty Dollars ($50.00) per set.

Specifications and contract documents, exclusive of cross-sections, may be obtained from the Commission upon deposit of Ten Dollars ($10.00) for each set, such deposits to be refunded in full to any actual bidder upon return of such documents in good condition within five (5) days after the date of the opening of the bids. Refund will be made for all plans, contract documents and cross-sections returned, if the project is withdrawn from letting by the Pennsylvania Turnpike Commission. Remittances are payable to the Pennsylvania Turnpike Commission and must accompany requests for drawings, specifications and cross-sections.

The character and amount of bid security to be furnished by bidder is stated in the Instructions to Bidders.

No bids may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

PENNSYLVANIA TURNPIKE
COMMISSION
James F. Torrance
Secretary and Treasurer
Harrisburg, Pennsylvania
December 30, 1948

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2518) will be received by Bureau of Reclamation, Paonia, Colorado, until 10 a.m., February 1, 1949, and then publicly opened for furnishing labor and materials and perform all work for the construction of diversion works and enlargement of Fire Mountain Canal, west of Somerset, Colorado, Paonia Project. Principal items in three schedules are approximately: 90,000 cu. yds. excavation; 12,000 cu. yds. backfill; 29,000 cu. yds. compacting embankment; 1,900 cu. yds. concrete; furnishing and installing 300,000 lbs. reinforcement bars; installing 21,000 lbs. gates and miscellaneous metal-work; and other work. Time allowed for completion will be 450 days. For particulars, address the Bureau of Reclamation, Post Office Box 623, Paonia, Colorado; or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.
(803)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2510) will be received by Bureau of Reclamation, Yakima, Washington, until 10 a.m., February 1, 1949, and then publicly opened for furnishing labor and materials and performing all work for the construction of single wood-pole transmission lines for Roza Division Pumping Plants, Yakima Project, Washington. Principal items are approximately: 61.91 miles of 34.5-kv. 3-phase transmission line; 2.68 miles of 13.8-kv. 3-phase transmission line; and 2.67 miles of 2.4-kv. single-phase distribution line. Time allowed for completion will be 300 days. For particulars, address the Bureau of Reclamation, Yakima, Washington; Building 1-A, Denver Federal Center, Denver, Colorado; or Washington 25, D. C.

MICHAEL W. STRAUS, Commissioner.
(802)

(Continued on page 132)

CONTRACTORS WATCH THIS SECTION

for New Projects

Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

Bids: January 20, 1949 (800)

State Road Work

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

ROUTE 25, SECTION 7C

Construction of Route 25, Section 7C, Inman Avenue Grade Separation, Township of Woodbridge, Middlesex County.

Roadway Items

Estimated:

18,200	cu. yds. Roadway Excavation-Earth
6,200	sq. yds. 4" Macadam Base Course
6,200	sq. yds. 3" Pen. Mac. Surface Course
20,400	gals. Bituminous Material

Bridge Items

670	cu. yds. Foundation Excavation
479	cu. yds. Concrete in Structures
282	cu. ft. Concrete Crib Wall

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Thursday, January 20, 1949, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J. and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner

Bids: January 13, 1949 (801)

State Road Work

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

ROUTE 4 PARKWAY, SECTION 1A

Construction of Bridges and Approaches at Route 35 and King George's Post Road on Route 4 Parkway, Section 1A, in Woodbridge Township, Middlesex County, Federal Aid Project No. U-188(7). The work involves the construction of a two span rigid frame underpass at King George's Post Road, and a two span steel bridge over-pass at Route 35.

The principal items of construction are:

Estimated:

3,680	sq. ft. Random Ashlar Masonry
65	cu. yds. Dimension Masonry
2,305	cu. yds. Foundation Excavation
5,036	cu. yds. Concrete in Structures
335,200	lbs. Reinforcement Steel
751,000	lbs. Structural Steel
11,445	lin. ft. Treated Timber Piles
49,172	cu. yds. Roadway Excavation-Earth
15,509	sq. yds. Macadam Base Course
13,437	sq. yds. Pen. Macadam, Intermediate Course
2,072	sq. yds. Pen. Macadam Surface
738	tons Bituminous Concrete Pavement
487	sq. yds. Rein. Concrete Pavement

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Thursday, January 13, 1949, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

NOTE: The proposed project is a "Federal Aid Project" authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements and by Sections 2, 3 and 4, P. L. 521, 78th Congress, and is to be performed in accordance with the special provisions and requirements of the Federal Works Agency, Public Roads Administration, as outlined in the specifications, which provisions require that labor be employed from lists furnished by the State Employment Service, Cor. Maple and Fayette Streets, Perth Amboy, N. J. The attention of bidders is directed to the special provisions covering subletting or assigning the contract. The minimum wage paid to all skilled labor employed on this contract shall be 65¢ per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be 75¢ per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.25 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner

Bids: January 17, 1948 (783)

Sanitary Sewers

ILLINOIS, ROCKFORD — The Sanitary District of Rockford, 3300 Kishwaukee Street—Sanitary Sewers in Quadrants #1, 2 and 3 totaling 7.14 miles of 8" to 21" diameter pipe, 1600 feet underdrains, 15676 feet concrete cradle and encasement, 3490 cu. yds. rock excavation, 1388 feet manholes, etc. Also, in Quadrant #4, 1385 feet of 15" diameter pipe with appurtenances, 1000 feet of which is in tunnel.

Bids close Monday, January 17th, 2:00 P. M. Central Standard Time. Cash, bidder's bond or certified check to 5% of bids required. Engineers—Arnold Lundgren, 1234 Fourth Ave., Rockford, Ill., The Sanitary District of Rockford, and Consulting Engineers—Greeley and Hansen, 220 S. State St., Chicago 4, Illinois.

Plans and Specifications available upon $20.00 deposit at Disposal Plant, which sum is refundable to bona fide bidders.

H. A. Riedesel, District Engineer
THE SANITARY DISTRICT OF ROCKFORD

Bids: January 25, 1949 (787)

Repairing 9th Street Bridge

Richmond, Virginia.

SEALED PROPOSALS WILL BE RECEIVED AT THE OFFICE OF THE CITY PURCHASING AGENT, 4TH FLOOR, MOSQUE BUILDING, LAUREL & MAIN STREETS, RICHMOND, VIRGINIA, UNTIL BUT NOT LATER THAN 11 O'CLOCK, A. M. January 25, 1949 for the "furnishing of materials and labor for repairing 9TH STREET BRIDGE over James River, Richmond, Virginia".

Form of Proposal, Plans and Specifications may be obtained upon application to the Director of Public Works, 217 Governor Street, Richmond, Virginia.

A charge of $5.00 will be made for these plans, etc., which sum will not be refunded unless a bona fide bid is submitted, and the plans, etc., returned.

A CERTIFIED OR CASHIER'S CHECK payable to the City of Richmond for the amount stated ($6,000.00) on proposals must accompany each bid as a guaranty of execution of contract. A BIDDER'S BOND for $7,200.00) will be accepted in lieu of a certified or cashier's check.

The contract may be awarded by the purchasing agent to the lowest responsible bidder, who shall be determined in accordance with rules and regulations governing purchases or contracts adopted and established by the council, and in accordance with and pursuant to sections 5.09, 5.11 and 12.07 of the city charter.

J. W. Huffman,
City Purchasing Agent.

Bids: January 27, 1949 (793)

Construction of Well House and Addition to Water Pipe Lines

Notice to Bidders

Sealed proposals for the construction of Water Works Addition will be received by the Village Board of the Village of Dryden at the office of the Village Clerk until seven o'clock P.M., E.S.T., on the 27th day of January, 1949.

Plans may be seen, and proposal forms and information for bidders can be obtained at the office of the Village Clerk at Dryden, New York, or at the office of William S. Lozier Company, Engineers, 10 Gibbs Street, Rochester 4, New York.

The work consists of the construction of a Well House and Additions to Water Pipe Lines. A charge of ten dollars ($10.00) will be made for plans and will not be refunded.

L. H. GRIDLEY
Village Clerk

December 30, 1948.

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2505) will be received by Bureau of Reclamation, Denver, Colorado, until 10 a.m., February 1, 1949, and then publicly opened for furnishing labor, equipment, and materials and performing all work for the construction of a 1,500-kva substation at Fleming, Colorado, Colorado-Big Thompson Project, Colorado. Time allowed for completion will be 350 days. For particulars, address the Bureau of Reclamation, Casper, Wyoming; or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.
(795)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2506) will be received by Bureau of Reclamation, Davis Dam, Nevada, until 2 p.m., January 20, 1949, and then publicly opened for furnishing labor and materials and performing all work for the construction of highway bridge across forebay channel at Davis Dam, Davis Dam Project, Arizona-Nevada. Principal items are approximately: furnishing and erecting 1,102,000 pounds of structural steel; furnishing and installing traveling maintenance platform for forebay channel bridge; and other work. Time allowed for completion will be 390 days. For particulars, address the Bureau of Reclamation, Davis Dam, Nevada; or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.
(794)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2516) will be received by Bureau of Reclamation, Denver Federal Center, Denver, Colorado, until 10 a.m., January 27, 1949, and then publicly opened for furnishing labor and materials and performing all work for the construction of foundations for Universal Testing Machine and alterations to Building 1-B, Denver Federal Center. Principal items are approximately: 1,500 cu. yds. excavation; 950 cu. yds. concrete; furnishing and erecting 268,000 lbs. structural steel; and other work. Time allowed for completion will be 240 days. For particulars, address the Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.
(796)

(Continued on page 151)

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
(Not available for equipment advertising)

$1.20 cents a line, minimum 4 lines. To figure advance payment count 5 average words as a line.

POSITIONS WANTED (full or part-time individual salaried employment only). ½ the above rates, payable in advance.

PROPOSALS, $1.00 a line an insertion

INFORMATION:

BOX NUMBERS care publication New York, Chicago or San Francisco offices count as 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by January 11th appear in January 20th issue subject to limitations of space available

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EXPERIENCED SUPERVISORY ENGINEERS

* * *

SOUTH AMERICA

A large integrated oil company needs experienced supervisory and staff engineers of the following categories in Venezuela.

SENIOR AND SUPERVISORY ENGINEERS.

10 to 20 years rounded experience in Civil, Electrical or Mechanical Engineering to perform staff engineering studies or to supervise design, estimating, and construction of townsites, public utilities and oil field industrial installations.

* * *

Retirement Plan, paid vacation, Career opportunity

P-7406 Engineering News Record
330 W. 42nd St., New York 18, N. Y.

MECHANICAL ENGINEER

to assume complete charge of plant engineering at large heavy chemical plant on Atlantic seaboard. Technical graduate, under 45, with minimum 10 yrs. experience in chemical plant. Salary commensurate with experience & ability. State age, education, detailed experience and salary expected.

Box ENR 669,
Rm. 1403, 220 W. 42 St., N. Y.

ENGINEERS WANTED

Architectural, Civil and Other Specialties are urgently needed by the City of Detroit to prepare plans, specifications and drawings and to supervise and inspect construction on a wide variety of municipal projects. Salary ranges from $3139 to $5048 a year for a 40 hour week. For information address the

DETROIT CIVIL SERVICE COMMISSION
15th Floor, Water Board Building,
Detroit 26, Michigan

ARCHITECTURAL and MECHANICAL

Draftsmen, Designers and Engineers for Immediate, Permanent Employment. Do not apply unless well qualified for work on Building construction. State Schooling, Experience and Salary.

LEO A. DALY CO.
Insurance Bldg. Omaha, Nebr.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED—ENGINEERS, Architects, Draftsmen experienced in the design of sewers, sewage treatment plants, water treatment plants and industrial buildings. Also engineers to supervise construction. State qualifications, experience, salary requirements and date available. P-1155, Engineering News-Record.

WANTED: EXPERIENCED Structural Designers, Seelye, Stevenson & Value, 101 Park Avenue, New York, N. Y.

GENERAL SUPERINTENDENT—General contractor wants assistant to supervise building construction projects. Must be experienced in all phases of building construction, from layout to completion, and must be capable of supervising several jobs simultaneously. Graduate engineer preferred. Age limit 45. Location Illinois. Salary open. Give present salary and date available in first letter. P-7426, Engineering News-Record.

WANTED—STRUCTURAL designers for industrial and power plant work. Experience in steel or concrete design essential. Office located in downtown Philadelphia. Give full details of past employment and availability. P-7077, Engineering News-Record.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service established 1927, is geared to needs of high grade men who seek a change in connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

(Continued on page 134)

WANTED

Civil Engineer or Supervising Contractor

To close and contract licenses with installers, contractors and applicators of special rubberized bituminous materials in great demand for buildings, roads, sewage disposal plants, etc.

Patents have been granted; grantee has pioneered in the construction field for over 30 years.

Commissions on sales either through your own specifications or effort, or dealer sales will be paid in the territory. Commissions remunerative and continuous. State territory you can cover; also do you specify materials on certain construction work.

RUBBERIZED OIL PLASTICS, INC.
82 W. Washington St. Chicago 2, Ill.

SUPERINTENDENT WANTED

By Contractor in New York area. Must be experienced in both building and heavy construction work. Immediate job is one of about three years duration, located in the Great Lakes area, but the right man can count on continuous employment. Must have good record with reputable contractors in order to be considered for this opening.

P. 7461 Engineering News Record
330 W. 42nd St., New York 18, N. Y.

Seattle City Light is in need of

ENGINEER DESIGNER

Must be Experienced in Mechanical, Equipment and Structural Design

This work will be out of the city

- GOOD SALARY -

for information contact

C. W. CUTLER, Room 103
City Light Bldg., Seattle 4

WANTED

CHIEF ENGINEER

Old established structural fabricating shop has an opening for a Chief Engineer. A real opportunity for a man who is (1) experienced in steel and concrete design; (2) a registered engineer; (3) some selling experience; (4) familiar with structural shop practices; (5) able to work with people and take full charge of all engineering.

Give complete history in first letter. Also state salary desired.

P-7513, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

WANTED—Mechanical and Structural Engineers For designing and detailing work on concrete reinforcement, structural steel and hangar door construction. Requirements are three to four years practical experience or recent graduation from technical school. Desirable working conditions and opportunities for advancement. These openings are with a nationally known steel fabricating company, located in eastern Ohio. Applicants will please submit a record of their qualifications.

P-3731, Eng. N-R, 520 N. Mich. Ave., Chicago

A COURSE OF INSTRUCTION BY MAIL IN

STRUCTURAL ENGINEERING

Thirty-seventh Year

(In the following list, Courses A, B, and C are abbreviated from our complete Structural Engineering course).

- **A—Public Works Structures.**
- **B—Architectural Engineering.**
- **C—Special Course (State Board Exams. for P.E.)**
- **D—Structural Engineering (complete).**
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Our Courses are offered principally to
ADULT CIVIL ENGINEERS AND ARCHITECTS

Ninety percent of our engineering students are former graduates (C.E.) from engineering colleges. Our courses have helped thousands of engineers to better positions, increased pay, and success "after forty".

Course B has helped many architects and draftsmen in passing the structural portion of State Board Examinations for license.

Literature sent without expense or obligation. **Write TODAY.**

WILSON ENGINEERING CORPORATION
College House Offices Harvard Square Cambridge, Mass., U. S. A.

WANTED

2 Structural detailer—checkers

Permanent jobs for good men with experience in all types of bridge and building work.
Moving expenses will be paid by the Company to men who qualify.
Apply by letter giving resume of experience, also salary desired.

PAXTON & VIERLING IRON WORKS
P.O. BOX 1085 OMAHA, NEB.

POSITIONS WANTED

(Continued from page 133)

CIVIL ENGINEER—Graduate, registered, 35, married, no children. 12 years experience in structural design, building construction in office and field, and fire prevention inspection work. Desires permanent position with opportunity for advancement. Any location considered. Address PW-7225, Engineering News-Record.

AUDITOR-ACCOUNTANT seeks connection with reputable construction or engineering firm. Twenty years as accountant, auditor, chief accountant, chief auditor, office manager and assistant project controller all classes construction. Experienced on large and small projects, joint ventures, cost plus fixed fee and subcontracts. References and bond, location immaterial. Reply PW-7428, Engineering News-Record.

STRUCTURAL ENGINEER, 34 desires permanent position in construction, design or plant eng. I am Ret. Prof. Eng. (Structural) Conn. Good references. PW-7424, Engineering News-Record.

CAPABLE STRUCTURAL Engineer, B.S., C.E. civil engineering, wants responsible position, offering 25 years background in industrial, architectural, hydraulic, indeterminate structures design and estimate. Prefers New York City or Northern New Jersey location. Registered both states. PW-7448, Engineering News-Record.

SUPERINTENDENT OF equipment or Master Mechanic, I have had twenty-five years experience on repairs and maintenance of all kinds of heavy construction equipment. Will accept domestic or foreign assignment. PW-6993, Engineering News-Record.

CIVIL ENGINEER practicing on own account in southern New England wants additional work in design, supervision of construction or surveying. Licensed in Conn. For information write: David Knox, Stonington, Conn.

BUILDING AND allied heavy or light construction all kinds of structures and types of contracts. Project or constructing manager, also general. Superintendent large projects only. PW-7389, Engineering News-Record.

MECHANICAL DESIGN Engineer, 28, college graduate, thoroughly experienced machine design, piping and plant layout. Employed Canada desires position United States. PW-7493, Engineering News-Record.

ENGINEER—EXECUTIVE ability, presently District Sales Engineer, experienced design, sales, field service heavy steel forms, batching plants, concrete mixers and paving machinery, desires connection with manufacturer or contractor in responsible capacity. PW-7497, Engineering News-Record.

SALARIED POSITIONS $3.500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (39 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N.Y.

POSITIONS WANTED

PROJECT MANAGER or General Superintendent on heavy construction project in United States. Fifteen years experience on both engineering and construction of highways in west and middle west. Experienced administrator. Project manager on three million highway project past six months. Civil Engineer. Experience includes construction of docks, sea walls, and pipe lines. Available about February 1. Present salary $12,000. PW-7483, Engineering News-Record.

STRUCTURAL DESIGN Engineer, Graduate C.E., Age 45, 23 years experience designing steel, concrete and timber structures, together with any type of foundation. Thoroughly competent to execute complete structural designs on any type building or waterfront structure, and supervise the execution of working drawings. Correspondence invited for position of responsibility. PW-7208, Engineering News-Record.

CIVIL-LEGAL Eng'r, 36, 13 years eng'r'g and constr'n N.E., N.Y., Tenn., Alaska, W. Indies, some selling, invites offers for position anywhere utilizing combined education. Positions involving preparation and interpretation of contracts, spec's, and claims, liaison with clients and subcontractors, supervision of constr'n, for contractors or eng'r'g firms, or as sales eng'r, or town m'g'r, especially suggested. PW-7505, Engineering News-Record.

RECENT GRADUATE; married; 21; Bachelor of Civil Engineering Michigan College of Mining and Technology; Structural; survey; or construction work; little or no traveling desired; North or West United States or South America; high school Spanish. PW-7552, Engineering News-Record.

CONSTRUCTION SUPT available now just completed commercial building in Wisconsin. Twenty-eight years of varied experience. Prefer middle west but will go anywhere. PW-7489, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT, Project Manager, or Job Superintendent. Over 15 years experience as such, in practically all types of Industrial, Commercial, and Governmental construction work. Excellent references. Available in Jan., 1949. PW-7510, Engineering News-Record.

SUPT AGE 56, Experience on schools, churches, housing projects, alterations and small homes. Carpenter by trade. Salary $150.00 per week. PW-7581, Engineering News-Record.

FORMER CONTRACTOR desires position, 12 years experience as prime contractor on sewer disposal, water filtration, industrial and residential construction, also 10 years as superintendent on large and small projects. Good references, available immediately. PW-7571, Engineering News-Record.

BUILDING CONST. Manager; 28 years experience. Thoroughly understands estimating, pricing, sub-letting, purchasing, supervision and office routine. PW-7564, Engineering News-Record.

SUPERINTENDENT 18 YEARS experience in concrete, dams, foundations, sewers, tunnels and buildings. Also steel sheathing and piling. Will go anywhere. PW-7559, Engineering News-Record.

(Continued on page 135)

LEARN TO ESTIMATE

Today, more than ever before, you must know how to analyze building costs. If you want to become a successful builder, learn how to prepare a correct estimate in a hurry. Get in on the profitable work now available wherever you turn. Your success is assured if your estimates are right; otherwise you are licked before you start.

The Tamblyn System of Estimating will make a real estimator out of you in a few weeks of your spare time. We are so sure that you will want to learn it, that we will send you our complete home study course for ten days examination absolutely free. If you don't think it is the finest thing you ever saw, just return it and it won't cost you a cent. If you like it and want it, send us $8.75 when 10 days are up and $7.50 per month until $38.75 is paid.

This estimating system is based on forty years of actual construction experience. It has been sold all over the world for more than twenty years. Thousands of estimators and contractors swear by it. Our offer isn't hot air and big talk. We don't give you a diploma or a lapel button, but we do teach you down to earth estimating which will bring you profitable business.

Just send your name and address today, and we will mail you the complete course at once for your approval.

TAMBLYN SYSTEM
1115 So. Pearl St., E-251
Denver, Colo.

Napoleon once said
"An Army Marches on Its Stomach"

We Have Fed Millions

KANE INDUSTRIAL SERVICE

- Industrial Feeding.
- Labor Camps.
- Labor Camp Equipment.
- Free Employment Agencies.
- 30 Years' Experience in the Housing and Feeding of Men for Satisfied Clients.
- Abundant Labor Supply available for Large Projects Anywhere.

VALENTINE B. KANE & ASSOCIATES
1410 State St. New Haven 11, Conn.

EVERY ISSUE
EVERY WEEK

Advertising of USED and Surplus New Construction Equipment is now accepted for all issues in the

SEARCHLIGHT SECTION of ENGINEERING NEWS-RECORD

SEARCHLIGHT SECTION

POSITIONS WANTED

(Continued from page 134)

CIVIL ENGINEER desires construction position in West Indies or South America, experienced survey, highway and railroad engineering, resident engineer on power project past 15 months, young, single and willing. PW-7570, Engineering News-Record.

PART TIME WORK WANTED

STRUCTURAL DESIGNER and detailer, material handling equipment designer, 22 years experience, desires part time work. Licensed engineer, member A.S.M.E. PTWW-7491, Engineering News-Record.

PATENT ATTORNEY

Patent Practice

before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Remmel, Registered Patent Attorneys, Suite 454, 815-15th Street, N.W., Washington 5, D. C.

WANTED

Contractors desiring to do resealing work of expansion, contraction and other types of cracks in paving and monolithic construction with rubberized bituminous material ZERO-LASTIC, a compound which will maintain seal at zero degrees temperature—a lucrative contracting business. For particulars, write to:

RUBBERIZED OIL PLASTICS, INC.
82 W. Washington St. Chicago 2, Ill.

FOR SALE

Contracting business, road building, land clearing, excavating, etc.
Completely equipped with good machinery, now operating.

Write P. O. Box 713 Little River Sta.
Miami, Fla.

WANTED

Large engineering firm wishes to acquire several complete plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible, strictest confidence.

Box 1206,
1474 Broadway, New York 18, N. Y.

FOR SALE

Heavy Construction Co.

Land Clearing, Road Building, Excavating
$30,000.00 in signed contracts
Inventory value only
Addressee 2265 S.W. 28th St.
Miami, Fla.

WATERPROOF
CANVAS COVERS
5¢ A FOOT USED 10¢ A FOOT NEW
NEW YORK SALVAGE CO.
144 Chambers St., N. Y. 7, N. Y.

FOR SALE
2,000 (Approx.)
LANDING STRIP MATS
17" x 10'

F.S. 7003, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

bought ROCKBITS sold
MOST TYPES AND SIZES
one of the
Largest Dealers on the East Coast
Send us your Quotation or Inquiry
INTERNATIONAL SERVICE BUREAU, Inc.
1025 Conn. Ave. N. W. Washington, D. C.

TAMPERS • DIGGERS • DRIVERS

1⅛" x 6" SHANK, FITS STD. HAMMERS

EACH TOOL BRAND NEW AND GUARANTEED

The Govt. buys only the best, replace your old tools at a fraction of their regular price. These tools are army surplus.

Reg. $14.50 TAMPERS	8" x 8" WITH STEM	$6.00
Reg. $9.30 CLAY SPADE	5½" x 8½"	$3.75
Reg. $18.00 SHEATHING DRIVER		$6.00

ALL SHIPMENTS FOR PHILA.

WILL SHIP RATED FIRMS ON OPEN ACCOUNTS. OTHERS SEND CHECK.

1744 Jacob Shannon & Co.

J. JACOB SHANNON & CO.
214 NORTH 22nd ST., PHILA. 3, PA.
THE OLDEST EQUIPMENT HOUSE IN PHILADELPHIA

WANTED

WANTED
2 ft. by 2 ft.
Foundation forms
Sidewalk and curb forms
Write or phone
WOODROCK CONT. CO., INC.
40-05 30th Ave.
Long Island City 3, N. Y.
Ravenswood 6-3838

WANTED
1—double cylinder Model 160 or single cylinder Model 200 pumpcrete machine
complete with pipe, fittings, etc., all ready for operation. Entire outfit must be in first class shape and available for delivery March 1, 1949.

W-7442, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

WANTED

Rotary kilns:
Size 11', 10', 9', 8', 7' and 6' dia. 100' or longer.
Compeb mills:
6' and 7' dia.
Tube mills:
5', 6' and 7' dia.
Jaw crusher:
7" x 9"
Ball mills:
7' in diameter or larger and 8' in length or longer.
Slurry filters, drum or disc type
Steel tanks 14' in dia. x 12' to 25' or longer with ¼" or ⅜" plate
Bradley Junior Pulverizer.

W. 7474 Engineering News Record
520 N. Michigan Ave., Chicago 11, Ill.

Compressors Wanted
STATIONARY - PORTABLE
LARGE OR SMALL
L. W. BAUER
22 Barnett Street Bloomfield, N. J.

WANTED
¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers
FRANK SWABB EQUIPMENT CO., INC.
Hazleton National Bank Building
HAZLETON, PA.
Telephone 4910

WANTED
ONE STEEL GUY DERRICK
mast 60 ft.; boom 50 ft. minimum; with bull wheel; rig for clamshell and five tons at 20°.

W. 7479 Engineering News Record
330 W. 42nd St., New York 18, N. Y.

WANTED
150 TON STIFF
LEG DERRICK
100 FOOT BOOM
Roberts Paving Company
Salisbury, Maryland

WANT TO BUY *NEW SURPLUS*
VALVES & PIPE FITTINGS
EAST COAST VALVE & FITTING CO., INC.
725 FIFTH AVE. BROOKLYN 32, N. Y.

WANTED
Practically new 25-35 ton clamshell Crawler Crane, 70-75 foot boom, independent boom hoist or live boom. Manitowoc or Loraine preferred.
ACE BUILDERS SUPPLY
450 E. 49th St. N. Y. C.
Plaza 5-0915

Wanted to buy
USED SECTIONAL STEEL BUILDINGS
20' x 200' x 10' high.

W-7554, Engineering News-Record,
330 West 42nd Street, New York 18, N. Y.

SHOVELS, CRANES, DRAGLINES

NEW Lorain 820, 2 yd. Diesel Shovel
Marion 111M, 3½ yd. Hi-Lift Diesel Shovel
Buc-Erie 54B, 2½ yd. Shovel, Diesel.
Buc-Erie 120B, 5 yd. Elec. Shovel.
Buc-Erie 120B, 5 yd. Steam Shovel.
Bay City 65, Gas Shovel, 1¼ yd.
Buc-Erie 22B Dragline. Diesel.
American 35 ton Diesel loco. Crane.
Koehring 1¼ yd. Model 501 Diesel
Buc-Erie 54B High Lift Shovel 2 yds.
P&H 1225 2½ yd. Electric Shovel.
Northwest 80 2½ yd. Shovel-Dragline.
Lima 802 Shovel-Drag. 2 yd. Diesel.
Lima 801 Dragline 2¼ yds. Diesel.
Lima 801 Crane-Dragline 2¼ yds.
Lima 410, 1½ yd. Shovel-Crane, Diesel.
Lima 1201 High Lift Shovel 2½ yd.
Lima 1201 Diesel Drag. 3½ yds.
P&H 855B 2 yd. Diesel Shovel.
Lorain 80 Shovel-Crane. Diesel. 1½ yds.
Link-Belt K-580 3½ yd. Shovel-Drag.
Link-Belt K 375 Crane-Dragline. Diesel.
Marion 40A Diesel 4 yd. Dragline.
Marion 362, 1½ yd. Diesel Shovel.
Marion 37 Electric Shovel 1¾ yds.
Marion 300 steam shovel 8 yds.
Marion 90 steam crane-pile driver.
Lorain 82 1½ yd Diesel Drag.
Northwest 6, 1½ yd. Diesel Shovel
Northwest 6 Diesel Drag. 1½ yds.
Buc-Erie 37B, 1½ yd. Diesel Shovel.
Byers 83 ¾ yd. Diesel Shovel. New
Buckeye 70 ¾ yd. Diesel Shovel-Drag.
Lorain 40, 15 ton Truck Crane.
Link-Belt TC 70, 15 ton Truck Crane.

ROCK CRUSHING PLANTS

Cedar Rapids Pitmaster Straight Line Plant Port.
Cedar Rapids Model AAA Plant.
New Diamond Port. 1 yr. old.
Cedar Rapids Morok Port. Excellent.
Universal Model 293A Portable.

TRACTORS—SPECIAL

Cat. D8 with 2-U Series DDPCU and Angledozer. **Price $13,500. Excellent.**
Cat. D8 Series 8R DDPCU and Angledozer. **Price $10,000. Excellent.**
Cat. D7 with angledozer
Cat. D4 with side boom.
Cat. D4 with angledozer.
4 Cat. D8 in 2U series.
Cat. D7 in 4T series.
2 Int. TD-9 with front end loaders.

ROAD CONTRACTORS EQUIP.

Finisher Koehring Long. 20′—24′
Finisher Blaw-Knox 10′—12′
Port. 500 CFM Diesel Air Compressor.
Rooter 5½ ton LaPlant-Choate Reinforcing Rod Power Bender, Alamo.
Blaw-Knox Concrete Spreader, 20′x24′.
Cat. 12 road grader 9K series.
Rooter LaPlante Choate 3 tine RP.
Road Forms 8000 ft. 9″x9″. Other sizes.
Cat. No. 11, Motor Patrol Grader.
Galion 101 motor patrol Grader.
Rome 404 tandem drive Diesel Grader.
Galion Model 201 Grader, full hydraulic.

ASPHALT PLANTS

B-G Bit. Concrete Model 848 Mixing.
Cedar Rapids "Speedline".
Cedar Rapids Portable 20 Tons per hr.
Cedar Rapids 4000# Model E Portable.

READY MIX CONCRETE PLANTS

B-K 105 tons Ag. bin, 200 bbls. Cement Bin, Complete with Weighbatchers.
B-K 100 ton Ag. bin, 3 compt. weighbatcher.
Butler complete ready-mix concrete plant 105 ton Agg. Bin 300 bbl. bulk cement bin.
Johnson complete ready-mix concrete plant 120 ton Agg. Bin 350 bbl. bulk cement bin.
Johnson 500 yd. Batcher plant; 3 compts. aggregate one for 500 bbl. cement. Excellent condition.
Butler Plant 300 T. aggr. 400 bbls. cement.
Butler 300 ton 3 comp. bin has 1 compt. for 400 bbls. cement, complete with weightbatcher, bucket elevator, etc.
Blaw-Knox 3 compt. 100 ton Agg. Bin.

TRANSIT MIXERS, PAVERS, ETC.

Maxom 4 yd. Concrete Dump Body.
Adnun Black Top Paver 10′-12′.
Pumpcretes, 160-180-190-200.
2 Jaeger 4 yd. on White Trucks.
Rex 4 yd. on White Truck.
Rex 4½ yd. on White Truck.
Ransome stationary Concrete Mixer 84S.
Multifoot 27-E, paver, rebuilt.
Rex 34E Dual Drum Paver.
Koehring 28-S Mixer. Gas Operated.
Rex 34E dual drum Paver, Like new.
5 New 10 ton Mack NR Diesel chassis.

TRUCKS—SPECIAL

Euclids, Rear Dump Model 27FD. New April, 1946. (3).
1—Model 31FD. New 1946.
To Be Sold as One Lot—$45,000.

FLOATING PILE DRIVERS, ETC.

Hull 24′x68′x6′ with 70′ Leads.
Hull 25′x63′x4′4″ with 65 ft. Leads.
Hull 28′6″x53′x7′9″ with 73′6″ Leads.
Hull 22′x48′x5′ with 45′ Leads.
Pile Driving Leads 90′ all steel, sectional, complete with sheaves, etc.
McK-T 11-B-3 dib. act. pile hammer.
#9B3 McK-T Pile Hammer. Recond.
10B3 McK-T Pile Hammer
Vulcan #3 Steam Hammer.
Turntable, McK&T. steam pile driving rigs, leads 73′ complete with boilers; can be used on scows. Special design.

HOISTS

Clyde 3 dr. 52 H.P. elec. and Swinger.
Lambert steam 9x10 2 drum with boiler.
Lambert 2 drum 10 x 12 no boiler.

DERRICK—STEEL & STIFF-LEG

Derrick & Hoist 75 tons stiff-leg.
American Terry stiff-leg 50 tons 90′ bm.
American Terry, stiff-leg 10 tons, 75′ bm.
Ketler 25 ton Guy, 100 ft. mast 90′ bm.
Insley Guy 20 tons, 115′ mast, 90′ bm.
Wiley 30 ton Steel Stiff-leg, 60′ boom.
Steel Guy 25 tons 110′ mast, 100′ bm.
Steel Guy 35 tons, 125′ mast, 115′ bm.
Steel Stiff-leg 25 ton, 3 drum Elec. hoist.

TRENCHERS—BACKFILLERS

Cleveland Model 110. Rebuilt.
Barber-Greene 44C
Cleveland Model 95 Trencher.
Parsons Model 21 Trencher.
Buckeye Model 120 Trencher.

30 CHURCH STREET
Cable "RICHWALSH" New York
RICHARD P. WALSH CO.
Telephones: Cortlandt 7-0723
7-0724
NEW YORK N. Y.

AIR COMPRESSORS

110-315, 420, 603, 1,000 Ft. I-R Diesels
110, 160, 220, 310 & 000 Gas Portable
2—676′, 870′, & 1350 Ingersoll Rand XCB Bltd · 1300 ft., 1572 & 2850 & 5011 Ing. Rand Elec.
Low Pres: 743, 1200, 1500, 2600 & 5600 ft.

CRANES—DRAGLINES

1 Yd., P. & H. 600 50′ Boom Crane
8—45 Ton & 25 Ton Cap. 100 Ft. Boom Whirleys with or without Gantrys, Steam Elec. Diesel
2 Yd. Monighan 60′ B. Elec. Dragline
16 Yds. 160 Ft. Boom Elec. Dragline
1½ Yd. 42B Bucyrus Steam 50 ft. Boom Crane & Shovel
1½ Yd. P. & H. Model 700B Dragline & Shovel
1—7 Yd. Cap. Marion Diesel Dragline
1—6 Yd. Cap. B.E. Monighan Diesel Dragline

CRUSHING PLANTS

24 x 30 Portable 50/75 Ton Per Hr. Cap.
25 x 36 Portable 100 Ton Per Hr. Cap.
24 x 36 & 36 x 48 Traylor Jaw Crushers
36 x 48 Traylor Jaw Crusher
1—40 x 48 in. & 1—42 x 54 in. Buchanan Jaw Crushers

ROLLERS

12 Tandem & 3 Wheel, 3, 5, 8, 10 & 15 ton

DRILL SHARPENERS

7—I.R. Models 40 & 54

DUMP CARS

136 TUNNEL CARS ½ Yd., 2 Yd. & 4 Yd. Cap.
40—12 Yd., 20 Yd. & 30 Yd. St. Ga. Air Dump
20—12 Yd., Western 3 ft. ga.

HOISTING ENGINES

STEAM: 14x12, 9x10, 8½x10 & 7x10
ELECTRIC: 30, 40, 60, 80, 100, 125 & 150 H.P.
GAS & DIESEL: 15, 40, 75, 90, 110 & 140 H.P.

LOCOMOTIVE CRANES

25 Ton American Steam & 3—20 Ton Ohio
35 Ton Industrial Brownhoist, Diesel
50 Ton Industrial Brownhoist, Steam

LOCOMOTIVES

33—Steam—40, 60, 110 & 220 ton
14—Diesel—15, 25, 45, 65, & 80 ton
44—Gasoline—4, 6, 8, 12; 16, 25 & 35 ton
16 Ton Vulcan Std. Ga. Gas

PAVERS—MIXERS

5—27E & 34E Dual Drum Pavers
16—¾, 1, 2 & 3 Yd. Mixers

PILE HAMMERS & EXTRACTORS

9—McKiernan-Terry No. 1, 3, 5, 6, 7, 9B3, 10B3
Vulcan 800 Extractor & Vulcan #2 & 1 Hammers
5 VULCAN 50c & 80c Hammers
Vulcan Model 5000 Super Hammers
3 United Model 1A & 1½A Hammers

PUMPCRETE

Model 160, 190 & 180 & 200 REX Pumpcretes

R R CARS

140—Flat Cars 30-40, 50 ton
20—Gondolas 40 & 50 ton
60—40 Ton Cap. Box Cars
126—8000 & 10000 gal. Tank Cars

ROCK GRAPPLERS

7—Owen & Blaw Knox 3 ton, 5 ton & 15 ton Cap.

SHOVELS

1¼ Yd. 41B Bucyrus Steam
1—17 Yd. Cap. Bucyrus Erie Elec. Shovel
2—10 Yd. Cap Marion Elec. Shovels
1— 8 Yd. Cap. Marion Elec Shovel
1— 5 Yd. Cap. Marion Elec. Shovel
1— 4 Yd. Cap. Marion Diesel Shovel
5 STEAM SHOVELS—3½, 5, 6 & 8 YD.
2—4 Yd. Marion Elec.

STEEL DERRICKS

5 Ton Steel Stiff Leg 40 Ft. Boom
2—Clyde 15 Ton Stiff Leg 100 & 125′ Boom
2—Terry 25 Ton 100′ Boom Guy Steel Erectors
3—7-10 Ton Guy 85′ & 50 Ton 100′

ORANGE PEEL BUCKETS

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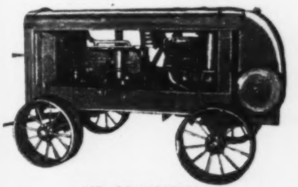

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48″	8	1/8″	1/16″	24″	4	1/8″	1/32″
42″	5	1/8″	1/16″	20″	5	1/8″	1/32″
36″	6	1/8″	1/16″	20″	4	1/8″	1/32″
30″	6	1/8″	1/16″	18″	4	1/8″	1/32″
30″	5	1/8″	1/16″	16″	4	1/8″	1/32″
26″	5	1/8″	1/32″	14″	4	1/16″	1/32″
24″	5	1/8″	1/32″	12″	4	1/16″	1/32″

Inquire For Prices — Mention Size and Lengths

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Width	Ply	Width	Ply	Width	Ply
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16″	6	10″	5	5″	5
14″	6	8″	6	4″	5
12″	6	8″	5	4″	4
12″	5	6″	6	3″	4

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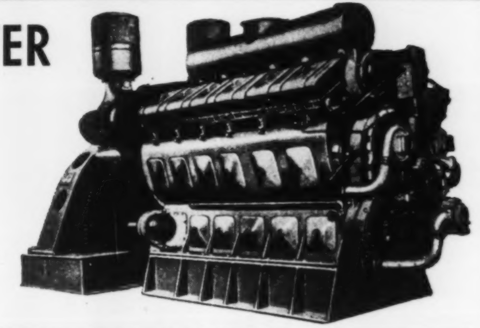

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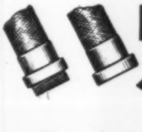

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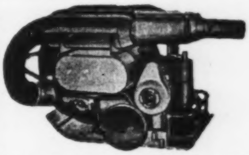

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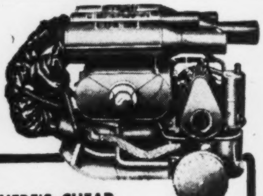

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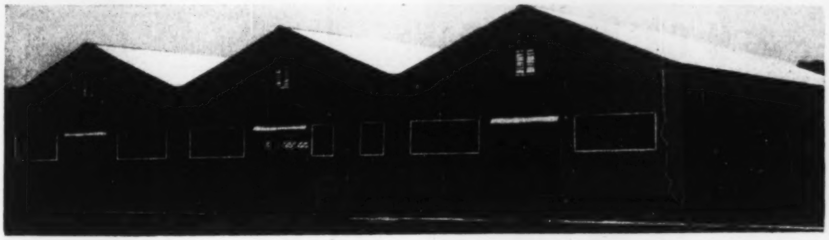

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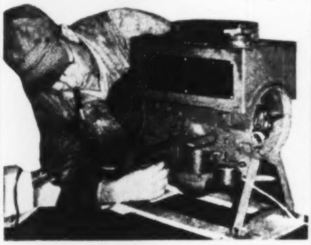

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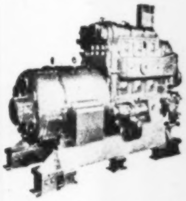

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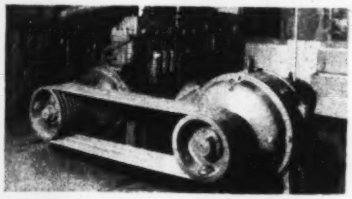

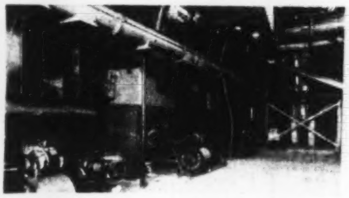

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Wm. Bros Boiler, 505 H.P. 150 lbs. working pressure. Stoker fed. 5060 sq ft. heating surface. 3 drum. Forced draft. Babcock & Wilcox Boiler. 480—3¼" tubes. 505 H.P. Sterling type boiler. Retubed—1947.

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Caterpillar Diesels, 120 H.P. 6 cylinder. Max. H.P. 145. Cont. H.P. 115. Bore 5¾". Stroke 8".

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Worthington Dual-Type No. L-465555. Pressure 100 lbs. Free Air 283 CFM. Refrigerant cooled. With Westinghouse 150 H.P. Synchronous motor and 25 KW D.C. Generator.

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Coal fired high pressure boilers (stoker operated). Manufactured by Titusville Iron Works. Total capacity 750 H.P.

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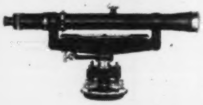

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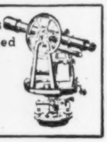

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½ & ¾ Yard Capacity, (Army Surplus) Arriving New Orleans about January 8, 1949—popular makes only, minor motor parts and cab repairs, will put these machines in a like new condition, as is, in lots of five or more, 50% of current prices.

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20 Tons Belgian flint pebbles
4' x 16' Tube mills (3)
1 American hammer mill with 125 HP direct connected motor
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Two industrial properties in desirable location, water power, railroad and highway, also good labor conditions.

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Approx. 330 Tons—3/16" x 5' x 15'
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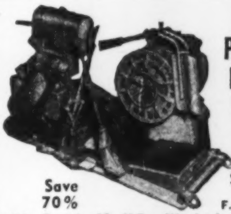

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3 KVA Single or 3 Phase. Delivers 3,000 watts at 125 volts 3 phase or three 1,000 watts, single phase. 4-cylinder gas engine 9.5 H.P. at generator speed. Control panel has main switch, circuit breaker and fuses, frequency meter, volt meter, ammeter, charging meter, oil pressure gauge. Made by Hobart Mfg. Co.

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$19.75 Each Singly **$17.50** Lots of Six

Mfrs. List $66.00

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Rugged and strong — fine quality, smooth finish. 32½" long — 14" high.

TOOL STEEL — Type NE 9450

Carbon Bar Annealed ⅞-Inch Octagon. 16' lengths. Weight 2.16 lb. per foot.

7¢ Per Pound

ANALYSIS

Silicon	18%	Chromium	28%
Manganese	44%	Nickel	28%
Carbon	52%	Molybdenum	12%

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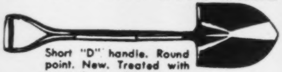

Short "D" handle. Round point. New. Treated with protective coating.

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CABLE BLOCK

McKissick 8" Sheave Ball-bearing. For Cable up to ½".

NEW **$12.00** DOZEN

USED METAL BUNK BEDS

$5.00 EACH

IN Quantities of 6

Angle Iron frame, 57" high. 36" mattress will fit. 34 helicals per spring. Dark brown finish. All in good condition.

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One—18"x60' Belt Conveyor.

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One—R-5 Caterpillar Bulldozer with LaPlante-Choate Angle Blade.

One—320 cu. ft. Sullivan Air Compressor, rubber mounted.

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One—Acme 3-wheel 5 ton Fine Grade Roller, with electric starter and scarifier.

6000' of 8x8 Road Forms.

4000' of 7" Road Forms.

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LORAIN 6 x 6 MOTOCRANE TL-20

9:00 x 20 10-ply tires 3p405 Dual Drive and Controls. Equipped for clamshell dragline and lifting crane operation. Standard 30-ft. boom plus one 5-ft. and one 10-ft. boom center section. American hook and weight. Johnson General Purpose Clamshell Bucket ⅜ yd. with teeth and counterweights. ½ yd. concrete form bucket.

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1—16S Jaeger Pneu. Tired Concrete Mixer with batchmeter

1—CMC 21 Ton 2 compartment bin and 26 Cu. Ft. batcher with scales and built up sides for double capacity

1—Syntron Gasoline Breaker-Tamper

Equipment all purchased this year and had little usage, in excellent condition.

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1½ YD. OSGOOD SHOVEL

Model 810, new Oct. 48, with Caterpillar D13000 engine used 200 hrs. Located Eastern Penna.

F.S. 7401 Engineering News Record

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1—1948 International TD-18 Tractor with Bulldozer

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Tractors used 100 to 400 Hrs.

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All or any part—1 Sauerman Dragline outfit, one yard bucket, including 2-drum Jaegar Hoist powered by International TD18 Diesel Engine in practically new condition, 4000 feet cable.

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Foot of Monroe Street TROY, N. Y.

DIESEL GENERATOR UNITS

Nordberg 1250 HP diesel electric generating units, (2), 5-EG; G.E.—Westinghouse 1060 KVA, 2300 v., 3ph., 60 cycles, 180 rpm, heavy duty, air injection, excellent condition, factory warranted, prompt Midwest shipment.

H. Y. SMITH CO.

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(Continued from page 132)

Bids: January 12, 1949 (781)

State Road Work

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BUREAU OF CONTRACTS & ACCOUNTS
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Sealed proposals will be received by Henry A. Cohen, Director, Bureau of Contracts & Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., until ten-thirty o'clock a.m., eastern standard time, on WEDNESDAY, JANUARY 12, 1949, for projects in the following counties:

County	Deposit plans	Bid deposit	Type	Miles	Engineer's estimate
Allegany	$5	$14,000	Thru truss 180′ misc. Asph. conc. opt.	0.09	$251,000
Bronx	20	79,000	Gr. sep. rigid fr., 2 @ 39′ Alterations Br. 6 Rigid fr. span 62′ 5¾″ Grad. & struct.	0,28	1,350,000
	20	210,000	Rigid fr., 2 @ 58.35′ girder 84′ Girder 2 @ 49.5′ Girder 3 spans (214.9′ East 221.7′ West) Conc. 9″ thk; 2 @ 36′ var. wdt.	0.62	3,545,000
Dutchess	5	25,000	Asph. conc. opt.	1.49	453,000
Kings	5	8,000	Alterations to viaduct	0.09	145,000
Monroe	5	6,500	I-beam 2 @ 60′ Bit. mac. pen. meth., Ty. 1	0.24	110,000
	5	5,000	I-beam 2 @ 60′ Bit. mac. pen. meth., Ty. 1	0.25	99,000
Orange	5	13,000	I-beam 3 @ 47′ Alpha—$171.50 Conc. 8″ thk., 22 wdt.	0.17	242,000
Rockland	5	21,000	Rigid fr., 2 @ 37½′ Asph. conc. opt. Conc. 9″ thk., 24″-48′ wdt.	0.31	360,000
Westchester	20	85,000	Rigid fr. 87½′; Conc. arch 53′ 10″ Conc. elliptical arch 50′ 7¾″ Conc. 8″ thk. 2 @ 24′ wdt.	0.58	1,429,000

Maps, plans, specifications and estimates may be obtained at the office of the Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers in whose district the roads are located. The name and address of the District Engineers will be furnished on request.

Plans may be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract containing 1 to 15 sheets is $5.00; 16 to 30 sheets, $10.00; over 30 sheets, $20.00. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by cash, draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders".

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The right is reserved to reject any or all bids.

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SUPT. OF PUBLIC WORKS

Bids: January 12, 1949 (786)

Construction of Barricades on Flood Control

NOTICE TO BIDDERS

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Approximate cost of Contract under Proposal No. 1—$83,800.

Approximate cost of Contract under Proposal No. 2—$58,400.

will be received by Henry A. Cohen, Director, Bureau of Contracts and Accounts, Department of Public Works, The Governor Alfred E. Smith State Office Building, Albany, N. Y., on behalf of the Department of Public Works until 10:30 o'clock A. M., eastern standard time on Wednesday, January 12, 1949 when they will be publicly opened and read.

Each proposal must be made upon the form and submitted in the envelope provided therefor and shall be accompanied by a certified check made payable to the State of New York, Commissioner of Taxation and Finance, of 5% of the amount of the bid as a guaranty that the bidder will enter into the contract if it be awarded to him. The title of the work must be written on the front of the envelope, sealed and delivered to Henry A. Cohen, Director, Bureau of Contracts and Accounts, The Governor Alfred E. Smith State Office Building, Albany, N. Y. The blank spaces in the proposal must be filled in, and no change shall be made in the phraseology of the proposal. Proposals that carry any omissions, erasures, alterations or additions may be rejected as informal. Successful bidder will be required to give a bond conditioned for the faithful performance of the contract and a separate bond for the payment of the laborers and material men, each bond in the sum of 100% of the amount of the contract or contracts in excess of $500 and such indemnity bonds as may be required by the Railroad Companies. Corporations submitting proposals shall be authorized to do business in the State of New York. Drawings and specifications may be examined free of charge at the following offices.

Guy W. Pinck, Deputy Chief Engineer
The Governor Alfred E. Smith State Office Building, Albany, N. Y.
State Architect, 18th Floor, 270 Broadway, New York City.
H. F. Brumm, District Engineer, 30 West Main St., Hornell, N. Y.

Drawings and specifications may be obtained from the Director, Bureau of Contracts and Accounts, The Governor Alfred E. Smith State Office Building, Albany, N. Y., upon deposit of $5.00 for each set

Refund in full will be made to bidders for one set of plans and specifications returned in good condition within 30 days of award of contract or the rejection of the bids. A 50% reimbursement will be made for the return in good condition of all other sets of the plans and specifications within 30 days following the award of the contract or the rejection of the bids.

Check for the plans and specifications shall be made payable to the State of New York.

Proposal blanks and envelopes will be furnished without charge.

B. D. TALLAMY, Superintendent
New York State Department of
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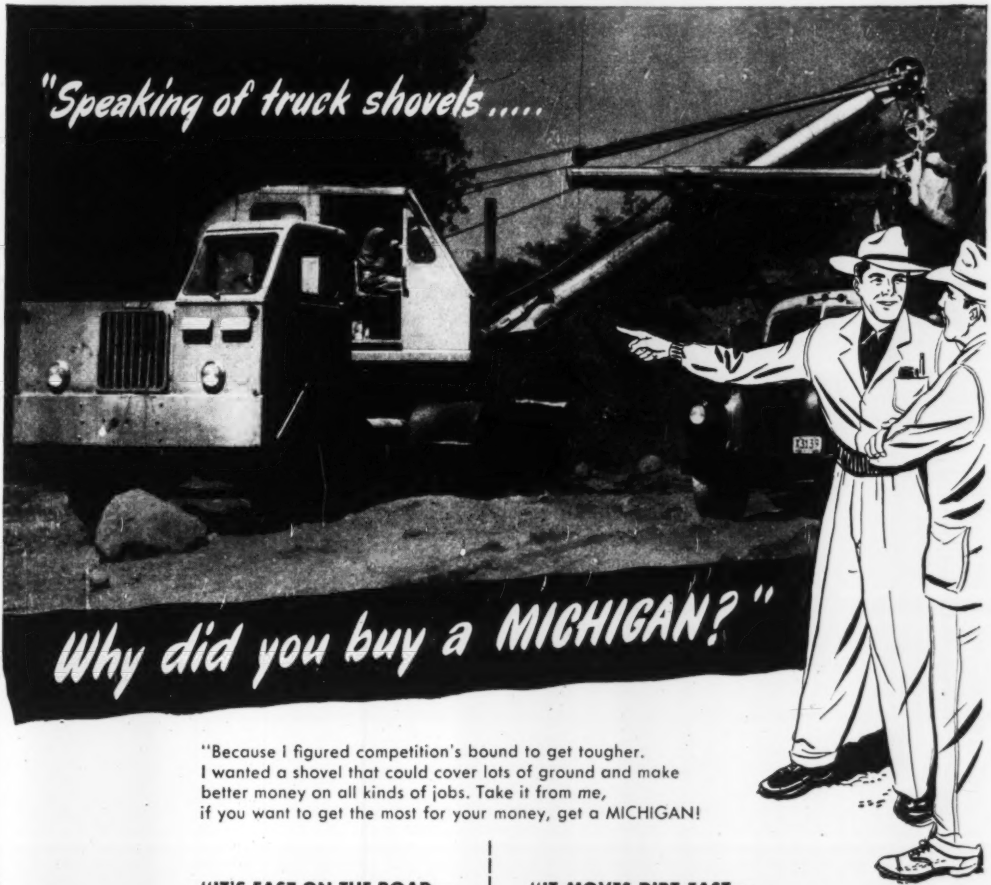
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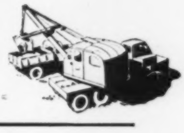

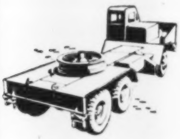

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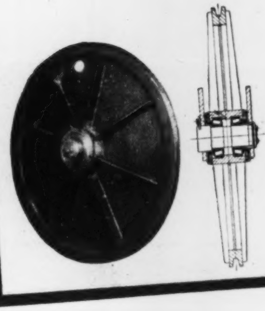

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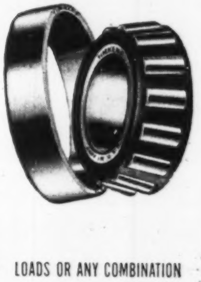

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